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BY

LEONARD P. SCHULTZ

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By Leonard P. Schultz

This paper is the third report on the collections made by me in Venezuela during 1942 and those made by the U. S. S. *Niagara* in the Gulf of Venezuela during 1924 and 1925. Other miscellaneous small collections were included when they were found in the National Museum, as were others kindly lent for study and report. To the following I express my sincere gratitude for their kindness and cooperation: Dr. Reeve M. Bailey, Museum of Zoology, University of Michigan, lent some of the Bond Venezuelan collections made in 1938–40. Dr. Karl P. Schmidt and Marion Grey, Chicago Natural History Museum, lent the W. H. Osgood specimens taken in the Maracaibo Basin. Dr. William Beebe, New York Zoological Society, lent his collections from the vicinity of Caripito. Isaac Ginsburg, U. S. Fish and Wildlife Service, identified all the specimens of Gobiidae and Eleotridae in the above-mentioned collections. Dr. Samuel F. Hildebrand, of the same Service, while working up his collections of marine fishes from Panama, identified several species of Venezuelan marine fishes and aided in many other ways. Luis René Rivas very kindly checked the spelling of the Spanish names of fishes and of the localities.

My interest in Venezuelan ichthyology began in the winter of 1941–42 when, at the invitation of Dr. Guillermo Zuloaga, assistant chief of explorations, Creole Petroleum Corp., Caracas, I undertook to study

and make collections of fishes in the Maracaibo Basin of Venezuela. This work continued from February through May of 1942. I proceeded to Venezuela under the auspices of the Smithsonian Institution and of the United States Department of State and was a guest there of the then Standard Oil Co. of Venezuela, and of the Lago Petroleum Corp., Lago de Maracaibo. To the officials of these companies I again express my gratitude for their full cooperation.

My first report on these collections was entitled "The Catfishes of Venezuela, with Descriptions of Thirty-eight New Forms," published February 11, 1944, in the Proceedings of the United States National Museum, volume 94, pp. 173–338, 5 figs., 14 pls. In this report is given an itinerary of my travels in Venezuela along with a list of collecting stations. The second report, "The Fishes of the Family Characinidae from Venezuela, with Descriptions of Seventeen New Forms," was published September 6, 1944, in the same Proceedings, volume 95, pp. 235–367, 27 figs.

A summary of my Venezuelan collections during 1942 reveals that the largest number of species taken in one locality was 45 from the Río Negro. The next largest collection numbered 35 from the Río San Juan (Motatán system), 33 from the Río San Pedro, and 33 from the Río Socuy. In the stream systems where fairly representative collections were made the following number of species were preserved: Río Motatán, 54; Río Negro, 45; Río Palmar, 41; Río Socuy, 33; Río Apón. 31; Río Machango, 31; and Río Chama, 10. There were 56 species from Lago de Maracaibo and along the coast of Gulf of Venezuela to Caño de Sagua. Altogether my collections contained 140 species from the Maracaibo-Gulf of Venezuela Basins; 25 from Río Guárico and Río Torbes; 1 from Río Tuy system; and 3 species common to the first two basins, a total of 169 species and subspecies that I collected.

The present report is not intended to be comprehensive in scope, since there are not yet sufficient collections of fishes from Venezuela to justify the writing of a descriptive catalog. It is rather a report on several collections of Venezuelan fishes, with descriptions of new species, and represents only the beginning in the study of the fish fauna of Venezuela. It is highly desirable that much more extensive collections be made in all the stream systems and lake basins of the country.

Unless otherwise indicated all collections were made in 1942 by L. P. Schultz in the Maracaibo Basin. Abbreviations used to indicate museum catalog numbers are as follows:

A. N. S. P.=Academy of Natural Sciences of Philadelphia.
C. N. H. M.=Chicago Natural History Museum.
U. M. M. Z.=University of Michigan Museum of Zoology.
U. S. N. M.=United States National Museum.

GEOGRAPHY AND CLIMATE OF THE MARACAIBO BASIN

Lago de Maracaibo has an average depth of about 100 feet (maximum 34 meters, or 111½ feet) and a soft muddy bottom. From its southern end to the beginning of the channel at Punta de Palmas, south of the city of Maracaibo, it is 154.5 kilometers, or 95.8 miles, long; the length of the channel from Punta de Palmas to Punta Vigía at entrance into El Tablazo is about 39⅝ kilometers, or 24.3 miles; and from Punta Vigía across El Tablazo to the entrance into the Gulf of Venezuela at Castillo de San Carlos is 20.75 kilometers, or about 12.9 miles, making a total length from the Gulf of Venezuela to the southern end of the lake of 214.9 kilometers, or about 133.25 miles. The greatest width of the lake is about 121 kilometers, or 75 miles. The long axis of the lake is almost directly north-south.

High mountain ranges enclose the Maracaibo Basin on all sides except the north. The Sierra de Perijá forms the western divide, whereas the Cordillera Oriental occurs at the southwestern side, and along the southern and southeastern side the lofty Cordillera de Los Andes, with Pico Bolívar reaching to a height of 5,005 meters. Another range of high hills and mountains forms the eastern rim of the basin. The northern end of the Maracaibo Basin is semidesert, contrasting sharply with the tropical jungle at the southwestern and southern ends, where the rainfall is very great along the eastern slopes of the Cordilleras de Perijá and Oriental even during the dry season.

During 1941 the Maracaibo Nautical School recorded the following monthly average temperatures and total monthly rainfall at Maracaibo, as published February 14, 1942, in the *Maracaibo Herald:* January, 81° F., 4 mm.; February, 83° F., 6 mm.; March, 82° F., no rainfall; April, 84° F., 16 mm.; May, 85° F., 144 mm.; June, 85° F., 11 mm.; July, 85° F., 9 mm.; August, 85° F., 3 mm.; September, 85° F., 38 mm.; October, 83° F., 26 mm.; November, 84° F., 68 mm.; December, 83° F., 5 mm. The rainfall thus totals 330 mm., or 13 inches.

The average monthly rainfall for the eastern shore at Lagunillas is given below for a period of 14 years (1928–1941), from information furnished by the Lago Petroleum Corp. These records are in inches, with minima and maxima in parentheses. January, 0.22 (0.00 to 1.33); February, 0.26 (0.00 to 1.08); March, 0.69 (0.00 to 2.09); April, 1.59 (0.11 to 5.41); May, 4.47 (1.49 to 9.21); June, 3.20 (1.07 to 7.72); July, 3.81 (0.87 to 11.71); August, 4.05 (0.76 to 8.91); September, 4.89 (0.94 to 11.90); October, 6.21 (2.62 to 11.53); November, 3.52 (0.45 to 8.78); December, 0.80 (0.00 to 1.78). Total average rainfall 33.98 inches, with a minimum of 18.40 in 1939 and a maximum of 51.01 in 1933. These data indicate the increase in amount of rainfall southward in the Maracaibo Basin. Undoubtedly the heaviest rainfall occurs at the southwestern corner of the Basin where the jungle is

heaviest and where the big rivers empty large quantities of muddy water into the lake.

During the dry season from December through March the trade winds are strongest, blowing from the north and northeast through the channel and lengthwise across the lake, becoming strongest in the afternoon, late evening, or early part of the night. The surface water of the lake apparently has a counterclockwise rotation in the southern two-thirds of the lake.

The specific gravity of the water was taken by means of a salinometer, and the following readings were recorded: Gulf of Venezuela, 1.021 at mouth of Caño de Sagua on incoming tide; El Tablazo and at Maracaibo Yacht Club, 1.006; Lago de Maracaibo, 2 km. off Lagunillas, 1.004; and at southwestern end of the lake 2 km. off Río Concha, 1.002. The turbidity of the water may increase its specific gravity a little at the southern end of the lake. Undoubtedly the deeper waters of this lake are salty.

FISHERIES OF THE GULF OF VENEZUELA-MARACAIBO BASIN

The fishes of the Gulf of Venezuela and Lago de Maracaibo are almost untouched commercially as compared with the great fisheries of the North Sea and those of the Atlantic and Pacific coasts of North America. I believe the fisheries of Venezuela cannot be greatly developed until more modern fishing equipment, including quick-freezing refrigeration and power fishing boats with refrigeration equipment, are used extensively. Such equipment would permit fishermen to go farther, stay out longer, and still be able to bring back desirable fishes to the market without deterioration and spoilage.

These bodies of water contain an abundance of anchovies, completely unexploited and almost unknown to the fishermen. Some are small, but others reach a length of nearly a foot, and all are delicacies. A special type of net would have to be developed for their capture. Other species, I found, such as mullets (lisa), various catfishes (bagre), bocachicas and pámpanos (Characinidae), robalos (Centropomidae), kingfishes and Spanish mackerel (carite or carite sierra), pámpanos (jurel), leatherjackets (zapatero de mar and palometa de lago), snappers (pargos), grunts (roncos), groupers (meros), sargos, croakers (corvinas), and mojarras de río, are common market fishes sold either fresh or salted. Further investigation over a period of a year would probably have revealed other fishes in the Maracaibo Market.

This much was obvious: That new fishing methods should be tried, such as the beam-trawl, otter-trawl, fish traps, purse seines, and other fishing gear, depending on the bottom and depth of water and kind of fish desired. Now that sharks are in demand, shark fishing should be attempted in these waters. With the great abundance of blue crabs in the lake a valuable fishery could be developed.

Considerable destruction of fish life is undoubtedly caused by oil wells in the lake near the eastern shore for a distance of about 80 km. Far out into the lake the surface is more or less covered with a film of oil. At times and in certain places the petroleum forms a thick scum on the surface, and as the volatile portions evaporate the tarry residue becomes thicker and thicker, finally settling into the water in tiny to large globules. These, while suspended in the water, drift with the wind across the lake and saturate the beaches, covering the aquatic plants and shore vegetation and the bottom with a layer of petroleum, making existence for fish life very hazardous. Unless this oil leakage can be stopped the northern end of Lago de Maracaibo, at least, may become rather barren, the sources of fish-food production exterminated, and the possibilities of extensive and valuable fisheries in the future greatly reduced.

These great shallow bodies of water with large rivers emptying into them should be considered one of Venezuela's great natural resources. Together with the Gulf of Paria and the Río Orinoco and its delta they are capable of producing many millions of tons of fishery products annually. If they were developed and properly controlled a maximum yield would result from a minimum of fishing effort. Such a balanced condition between fishing and natural reproduction of fishes can be obtained only through unbiased studies by adequately trained fishery biologists and ichthyologists, who would recommend the proper controls for the various fisheries.

DISTRIBUTION OF FRESH-WATER FISHES

In this report the fresh-water fish fauna of Venezuela is considered as including those families whose genera and species are predominantly permanent inhabitants of fresh waters and which, except for the Cyprinodontidae, enter brackish waters only more or less as stragglers. Such families are: Pimelodidae, Callophysidae, Auchenipteridae, Ageneiosidae, Bunocephalidae, Cetopsidae, Pygidiidae, Doradidae, Callichthyidae, Astroblepidae, and Loricariidae (all catfishes), and in addition the Characinidae, Sternarchidae, Gymnotidae, Electrophoridae, Cyprinodontidae, Poeciliidae, Synbranchidae, Polycentridae, and Cichlidae.

The relationships and derivation of the fresh-water fish faunas of the various stream systems of Venezuela cannot be worked out at this time with any degree of certainty because the various species of fishes occurring in many of the drainage systems are as yet little known or unknown.

A list of drainage basins or stream systems of northern Venezuela is presented below to aid in the interpretation of this report. Each indentation indicates that the body of water is tributary to the one under which it is indented.

Gulf of Venezuela
- Río Cocuiza
- Río Capatárida

El Tablazo
- Río Limón
  - Río Socuy
    - Lago Tulé
  - Lago de Maracaibo [1]
    - Río Palmar
      - Quebrada la Gé
    - Río San Juan
    - Río San Ignacio
    - Río Apón
      - Río Cogollo
    - Río Santa Ana
      - Río Negro
    - Río Catatumbo
      - Río Zulia
        - Río Pamplonita
          - Río Táchira
    - Río Escalante
    - Río Chama
    - Río Motatán
      - Río San Pedro
      - Río San Juan
    - Río Misoa
    - Río Machango

Caribbean Sea (coastal streams) [2]
- Río Tocuyo (Estado de Falcón)
- Río Yaracuy (Estado de Yaracuy)
- Streams near Puerto Cabello (Estados de Carabobo and Aragua)
- Streams near La Guira and Macuto (Distrito Federal)
- Río Tuy (Estado de Miranda)
  - Río Guaire
- Río Unare (Estado de Anzoategui)
- Río Manzanares (Estado de Sucre)
- Golfo de Paria
  - Río San Juan
    - Guanoco or Pitch Lake
  - Río Guanipa
  - Orinoco Delta
    - Caño Mánamo
      - Río Morichal Largo
        - Río Tigre
      - Río Uracoa
    - Río Orinoco
      - Río Coroni
      - Río Caura
      - Río Suata

[1] All rivers listed in a counterclockwise direction around this lake.

[2] Listed from west toward the east beginning on the eastern side of the Península de Paraguana, opposite Coro, and continuing to the Gulf of Paria. Lago de Valencia is an enclosed basin at present, but it is listed below under the Orinoco system.

Caribbean Sea (coastal streams)—Continued
Golfo de Paria—Continued
Orinoco Delta—Continued
Río Orinoco—Continued
Río Manapire
Río Apure
Río Guárico
Río Portuguesa
Río Guanare
Río Chirgua
Río Pao
Lago de Valencia [3]
Río Cojedes
Río Uribante
Río Frío
Río Torbes

During the preparation of a working distributional chart or table of the form published by Eigenmann,[4] I came to the conclusion, after several days of labor, that such a chart, instead of giving a clear picture of the actual distributional relationships of the fish fauna for the various basins, instead presents a picture of the amount of collecting that has been done in these various basins, and the care with which the material was studied or reported upon. For instance, Eigenmann's report on the fresh-water fishes of British Guiana has a large number of new species, many based on a single specimen. There is no comparable work on the fauna of the Orinoco system or even the Amazon. Thus in such charts the Guianas appear to have a fauna greatly in excess of that of the Orinoco, because the fishes of the latter great river system have never been thoroughly investigated. The Orinoco system, with its direct connection through the Rio Negro with the Amazon, should have a fauna more extensive than that of the Guianas. Therefore, I concluded to confine my remarks on distributional relationships between drainage basins to general statements, awaiting the time when these faunas are better known.

The fresh-water fish fauna of the Maracaibo Basin is distinctive as to its species, since nearly every one except those living in river mouths is a little different structurally from those in adjoining basins and may be subspecifically distinct. When taken as a whole it appears that this fauna is almost as closely related to that of the Orinoco as to that of the Magdalena, especially those species inhabiting the upper courses of the rivers. The lowland species of the Maracaibo Basin appear to be very similar to those of the Magdalena, and some are the same species. Undoubtedly during the mountain building around the

[3] Lago de Valencia is said to have been much larger at one time and to have had an outlet to the Orinoco system through the Río Pao.

[4] Indiana Univ. Studies, vol. 7, No. 45, 1920; *ibid.*, No. 47, 1920; Eigenmann and Allen, Fishes of western South America, pp. 53-61, 1942.

western, southern, and southeastern sides of the Maracaibo Basin, stream capture has played some part in causing crossover of species among the Orinoco, Magdalena, Catatumbo, Santa Ana, and Chama Rivers. Just how extensive this may be must await extensive collecting in the headwaters of those rivers. In general, the genera occurring in the headwaters have a much more extensive distribution than those in the lower courses and in the lowlands. All the following genera of the Maracaibo Basin occur in the lower courses of the rivers and are distinctive for that Basin and so far have not been found outside of it: *Sovichthys*, *Perrunichthys*, *Hoplomyzon*, *Tridensimilis*, *Doraops*, *Saccoderma*, *Creagrutops*, and *Hubbsichthys*. In a recent letter Cecil Miles reports finding *Dupouichthys* in the Magdalena system.

In view of the fresh-water nature of the southern part of Lago de Maracaibo, the fauna of all the rivers tributary to this lake may be expected to have the same species, with some distinctive ones isolated or restricted to the rapid or torrential parts of the rivers. This appears to be true so far as my collections from this Basin are concerned, but as yet no good collections have come from the headwaters of the Catatumbo, Escalante, or Santa Ana Rivers, among others. Undoubtedly the number of species will be nearly doubled when the Basin including the lake itself, is thoroughly searched and studied.

The numerous coastal streams emptying into the Caribbean Sea along the north coast of Venezuela are almost unexplored ichthyologically. When studied they should present another interesting chapter in Venezuelan ichthyology. These streams should be rich in cyprinodonts and other genera and species of the lowlands.

The fish fauna of the Valencia Basin is strikingly like that of the Río Guárico, with which it was once connected, but as in most of the stream systems it contains distinctive species not yet reported from elsewhere.

DISTRIBUTION OF MARINE FISHES

The specimens of fishes forming the basis of this report indicate in general that the marine fishes of Venezuela form a part of that fauna which extends from the Gulf of Mexico, Caribbean Sea, and West Indies southward along the coast of Brazil to the mouth of the Río La Plata. Certain elements of that fauna, as far as is known at present, appear to be restricted to such bodies of water as the Caribbean Sea, Gulf of Venezuela–Lago de Maracaibo, and Gulf of Paria. Undoubtedly as further collecting is done the ranges of these and many other species will be greatly extended.

Lago de Maracaibo is a great body of water, brackish at its northern end, probably salty in its deeper parts, but at least the great southern end with its many caños is fresh at the surface. This condition has made possible the infiltration of marine fishes from the Gulf of

Venezuela and of fresh-water species of fishes in the southern portion where the great rivers enter. Thus, Lago de Maracaibo contains an interesting mixture of marine, brackish, and fresh-water species. Although the fish fauna of the lake is not adequately known at present, enough knowledge has accumulated to indicate that the marine and fresh-water species have adapted themselves to live in this body of water, and in so doing some have changed a little structurally. These have evolved into more or less separate biological units, recognized in this report as either species or subspecies.

Those families of fishes that are usually considered marine by ichthyologists and that have representatives that have been found in Lago de Maracaibo and in the Río Orinoco are discussed below.

In Lago de Maracaibo, sharks, sawfishes, and large stingrays were reported, but I did not have an opportunity to fish for these. Sharks are caught by fishermen as far south as off the mouth of the Río Santa Ana. The occurrence of sharks in fresh-water lakes with access to the sea is not confined to Lago de Maracaibo. In Lake Nicaragua *Eulamia nicaraguensis* occurs in abundance and reaches a large size.

Among the elasmobranch fishes the stingrays of the family Dasyatidae have been most successful in evolving permanent species in South American fresh waters. The genus *Potamotrygon* has one species in the Río Orinoco and the Guianas, another in the Río Atrato, Río Magdalena, and Maracaibo Basins, and others farther south. These fresh-water stingrays occur far upstream, the females when caught often carrying young.

Several other marine families of fishes have representatives in fresh or brackish waters. The anchovies, or Engraulidae, have a few species occurring regularly in the fresh waters of the Río Orinoco and of the Lago de Maracaibo and its tributaries. These belong to the genera *Anchoa* and *Lycengraulis* in Venezuela.

The tarpon, *Tarpon atlanticus*, and the tenpounder, *Elops saurus*, are regular inhabitants of Lago de Maracaibo and in the lower courses of its large tributary rivers. The needlefishes, family Belonidae, were represented by *Strongylura timuacu*. The females, when taken at the southern end of Lago de Maracaibo, contained mature eggs that flowed from the vent with gentle pressure. This needlefish was taken far up the Orinoco system in the Río Apure. The Hemiramphidae, or halfbeaks, were represented by *Hyporhamphus roberti* in Lago de Maracaibo.

Two genera of pipefishes, or Syngnathidae, namely *Oostethus* and *Pseudophallus*, were found in the lower courses of rivers, probably in brackish water. Soles of the family Bothidae, genus *Citharichthys*, and tonguefishes, family Achiridae, of the genera *Hypoclinemus*, *Achirus*, and *Trinectes*, regularly occur in brackish water, a few venturing even into fresh waters.

I found the Atherinidae, or silversides, represented by a fresh-water species in Lago de Maracaibo, and another species in the northern end where the water is brackish. Lago de Valencia also has a species of silverside.

The mullets, or Mugilidae, are represented by *Agonostoma monticola* in Venezuelan fresh waters. *Mugil curema* and *M. brasiliensis* are found in brackish water in abundance, along with *M. trichodon*. I took *M. curema* at the southern end of Lago de Maracaibo in fresh water.

The robalos, family Centropomidae, are abundant in brackish, salt, and fresh waters, probably most abundant in brackish waters.

In the family Carangidae the leatherjacket, *Oligoplites palometa*, occurred in fresh, brackish, and salt waters. It is abundant in Lago de Maracaibo at the southern end in fresh water.

The mojarros, or carpetas, family Gerridae, represented by the genera *Eucinostomus* and *Diapterus*, were abundant in the brackish waters of Lago de Maracaibo and in coastal lagoons. Two species, *Eucinostomus argenteus* from the Río Apure and *Diapterus plumieri* from the Río Concha, were from fresh water.

The Ariidae are the only family of nematognaths, or catfishes, predominately living in salt and brackish waters. In my report on the catfishes of Venezuela I used the family name Bagreidae, which may be unfortunate since there is another family name spelled very similarly. I now use Ariidae in its place. Several genera and species of these marine catfishes occur regularly in both marine and brackish waters in abundance in Lago de Maracaibo and undoubtedly in the lower Río Orinoco.

In the croaker family, Sciaenidae, *Plagioscion* and *Pachyurus* may be considered fresh-water genera. They are found in the Río Orinoco but are not yet reported from the Maracaibo Basin. The corvina, *Cynoscion maracaiboensis*, is a brackish-water species probably confined to Lago de Maracaibo.

Several members of the Gobiidae and Eleotridae occur in brackish waters, such as the genera *Gobiomorus*, *Garmannia*, *Evorthodus*, *Bathygobius*, *Gobionellus*, and *Sicydium*, whereas the genera *Microphilypnus*, *Gobiomorus*, and *Sicydium* have been taken in fresh water.

Among the clingfishes, family Gobiesocidae, the only species occurring in fresh water is *Gobiesox cephalus*.

I found the puffer, *Sphoeroides testudineus*, family Tetraodontidae, very abundant in the brackish waters near Maracaibo, whereas *S. eulepidotus* was very rare, but a single small specimen was collected in brackish water.

Gordon Gunter (Amer. Midl. Nat., vol. 28, No. 2, pp. 305–326, 1942) presents lists of fishes occurring in both fresh and salt waters of North and Middle America. No such list has been prepared for South America.

HISTORY OF ICHTHYOLOGY IN VENEZUELA

As far as I have been able to find the fresh-water stingray of the Río Meta in Venezuela, one of the most dreaded aquatic inhabitants, is the first fish of that country to be figured and described. It appeared in a paper by Roulin (1829), but it was not given a scientific name. The first scientific contribution appears to be that by two other Frenchmen, Cuvier and Valenciennes, who included in their famous work "Histoire Naturelle des Poissons" descriptions of new fishes, published from 1828 to 1849. M. Plée apparently sent specimens to the Paris Museum from the vicinity of Maracaibo and Lago de Maracaibo, Puerto Cabello, and La Guaira, as well as from other localities in the West Indies. The few species described by these French authors represented the known ichthyological fauna of the Maracaibo Basin for a period of 75 years, until after the turn of the century.

Although Boulenger in 1903 and Regan in 1903 and 1905 described a few new fishes from the Maracaibo Basin and from Venezuela, no extensive collecting of fresh-water fishes was done in the Maracaibo Basin until Dr. Franklin F. Bond took fair series during 1938 and 1939, and I made extensive collections during February through May of 1942.

Numerous authors have reported on small collections of Venezuelan fishes from outside the Maracaibo Basin, but the fish fauna of the Basin itself has remained an ichthyological incognito until the present. Even now it cannot be said that the fish fauna of Venezuela is well known; perhaps it is only half known, for there are no extensive collections from any of the major tributaries of the Orinoco system. The coastal rivers from the Gulf of Paria to the Maracaibo Basin are practically unknown ichthyologically. New and unusual forms of fishes should turn up as experienced collectors begin to work in these and other rivers of Venezuela. Even with the collecting in the Maracaibo Basin the two major rivers, the Catatumbo and the Santa Ana of that Basin, as well as the lake itself, remain practically untouched. My work and that of others should be considered only preliminary, for years of collecting must be done before the fishes of Venezuela are well known.

The following minor contributions on Venezuelan fishes should be mentioned: Rudolph Kner in 1854 and 1859 and Wilhelm Peters in 1860, 1868, and 1877 reported on early studies. Peters's 1877 report was based on specimens collected by Dr. Carl Sachs in Venezuela on his trip from September 27, 1876, to June 28, 1877. Albert Günther, 1859–1866, recorded a few species of fishes from Venezuela, mostly from Puerto Cabello, La Guaira, and the vicinity of Caracas. Another early author, Adolfo Ernst (1877), published a book that devoted three pages to fishes. Two other early authors, Charles Lütken

(1874) and F. Mocquard (1886, 1889), have referred to or described a species or so of fishes from Venezuela.

The outstanding contributions by Franz Steindachner, from 1868 to 1917, were based largely on specimens from the Orinoco system. His most important work, as far as Venezuela is concerned, appeared in 1910 and 1917.

Jacques Pellegrin (1899) reported on a small collection of fishes from the Río Apure system and wrote other papers from 1903 to 1912 that included Venezuelan records.

During more recent years other authors have mentioned a few species of fishes. Most important among these is Jan Metzelaar's 1919 report on the marine fishes taken by Dr. Boeke largely from the Venezuelan localities of Puerto Cabello, La Guaira, and Guanta. Dr. Carl L. Hubbs in 1920 described a new goby from near Macuto. Francesca La Monte in 1929 named two fishes from Mount Duida. Ernst Ahl in 1928 and Enrico Tortonese in 1939 recorded a few fishes from Venezuela.

Although Dr. Carl H. Eigenmann and his coauthors published a large series of papers on South American fishes, these give only casual mention of Venezuelan localities except in a single paper (Eigenmann, 1920a). Dr. A. S. Pearse in 1919 and 1920 reported mostly on the ecology of this same collection from the Valencia and Río Tuy Basins.

Henry W. Fowler, although mentioning Venezuelan fishes in several of his numerous papers, made two reports (1911, 1931) on collections made in Venezuela. The specimens on which Fowler based these reports came from northeastern Venezuela from streams tributary to the Gulf of Paria and from the lower Orinoco system.

Dr. George S. Myers, who has written numerous short papers on South American fishes, has referred to Venezuelan localities in several published from 1924 to 1944. He devoted a major part of the following contributions to Venezuelan fishes: 1927, "Descriptions of New South American Fresh-water Fishes Collected by Dr. Carl Ternetz"; 1928, "New Fresh-water Fishes from Peru, Venezuela, and Brazil"; 1932, "A New Genus of Funduline Cyprinodont Fishes from the Orinoco Basin, Venezuela"; 1935, "Four New Fresh-water Fishes from Brazil, Venezuela and Paraguay." His latest and largest contribution on Venezuelan ichthyology appeared in 1942 under the title "Studies on South American Fresh-water Fishes, I," in which he described some new species of fishes from the Maracaibo Basin, the first since the time of Cuvier and Valenciennes. The collections of Venezuelan fishes on which this paper was based were made largely by Dr. F. F. Bond during 1938–1939, but the bulk of Bond's fresh-water fishes are still at Stanford University and as yet not reported upon.

Codazzi (1940) published a 3-volume work and mentioned common

names of fishes in volume 1, pp. 259–267. His descriptions under each name indicate unfamiliarity with practically all the fishes discussed.

The book by Eduardo Röhl (1942) devotes pages 353 to 413, figures 172 to 230, to fishes. Although it is intended for popular use, the author used a most antiquated scientific terminology, based in large part on papers written over half a century ago. However, Röhl's book has been a valuable source of common names of Venezuelan fishes in spite of its other shortcomings from an ichthyological standpoint. It contains numerous records of marine fishes for Venezuelan waters found nowhere else.

My own contributions on Venezuelan fishes began in 1943, based on my collections made in 1942. In addition to these I have had at my disposal other collections that have been included in this and in previous reports. The first were a few specimens collected by Lyon and Robinson at Macuto, Venezuela, August 1 and 2, 1900, and given by them to the United States National Museum. Next, the Chicago Natural History Museum kindly lent for report and study a small collection made by Dr. W. H. Osgood in 1911 at Encontrados and other localities in the Maracaibo Basin, along with specimens collected in 1920 by Osgood and Conover. I also found in the national collections a few specimens collected by Dr. Henri Pittier in 1923, and by Dr. Arnoldo Gobaldon in 1935, probably in connection with the work of the International Health Board. Other fresh-water fishes from the vicinity of Caripito, collected by Dr. William Beebe in 1942, were kindly lent for study and report. Dr. Beebe has published a few papers on his Caripito expedition in Zoologica beginning in 1942. Almost the only marine fishes from Venezuela that I have had for study were those collected by the U. S. S. *Niagara* in the Gulf of Venezuela during 1924–1925, through the efforts of Capt. P. P. Blackburn, who sent them to the former U. S. Bureau of Fisheries. Later they were transferred to the National Museum through the courtesy of Dr. S. F. Hildebrand, who had reported on the anchovies from this collection in 1943. In addition I was able to obtain a few marine fishes during my 1942 Venezuelan trip.

The history of Venezuelan ichthyology may best be gained by a glance at the section "Literature Containing References to Venezuelan Fishes" at the end of this paper.

GLOSSARY OF VENEZUELAN LOCALITIES MENTIONED IN THIS REPORT[5]

Altagracia: Town at mouth of Maracaibo Strait.
Amuay, Bahía de: Bay in Gulf of Venezuela.
Asfálto, Lago (or Pitch Lake): Asphalt lake near Guenoco, east of Caripito.
Barcelona: Town in northeastern corner of Estado de Anzoátegui.

[5] A map of the Maracaibo Basin was included in each of my previous reports on Venezuelan fishes (Schultz, 1944a, p. 175; 1944f, p. 367).

Barquisimeto: Town on upper Río Cojedes, Estado de Lara (Orinoco system).
Bifurcation of Río Orinoco: Probably below Barrancas.
Burro, Isla del: Island in Lago de Valencia.
Caicara: Town on Río Orinoco below mouth of Río Apure.
Calabozo: Town on Río Guárico, Estado de Guárico.
Caños. (See under Ríos.)
Capatárida: Town near coast of Golfo de Venezuela, in Estado de Falcón.
Caracas: Capital of Venezuela, in Distrito Federal.
Cariaco, Golfo de: Gulf on coast of Venezuela, Estado de Sucre.
Caripito: Town on northern edge of Estado de Monagas.
Carúpano: Town in Estado de Sucre.
Ciénaga del Guanavana: Swamp about 10 km. north of Sinamaica.
Ciudad Bolívar: City on lower course of Río Orinoco.
Cumaná: Coastal city at mouth of Golfo de Cariaco, in Estado de Sucre.
Cumanacoa: Town in Estado de Sucre.
Duida, Mount: Mountain on the upper Río Orinoco in southern Venezuela.
Egido: Town 14 km. below Mérida, Estado de Mérida.
El Cable: Submarine cable at Carúpano, Estado de Sucre.
El Callao: Town on Río Yurupuri, south of Guacipatí.
El Mene: Town 56 km. east of Altagracia.
El Sombrero: Town on Río Guarico in Estado de Guárico near southern border of Estado de Aragua.
El Tablazo: Bay between Gulf of Venezuela and Lago de Maracaibo.
El Valle: Suburb south of Caracas.
El Valle: Settlement at Porlamar, Isla de Margarita.
Encontrados: Town on lower Río Catatumbo.
Estanques: Town on Río Chama, Estado de Mérida.
Estanques, Bahia de: Bay in Gulf of Venezuela.
Guacipatí: Town southeast of Ciudad Bolívar.
Guanta: Coastal town 13 km. northeast of Barcelona, Estado de Anzoátegui.
Guasdualito: Town in Estado de Apure.
Guenoco. (See under Lago de Asfalto.)
Higuerote: Seaport in Estado de Miranda.
Irapa: Town on shore of Golfo de Paria, Estado de Sucre.
Jacuque. (See under Punta.)
La Boca: Lago de Valencia.
La Florida: Town on eastern side of Caracas.
La González: Town in Estado de Mérida.
La Grita: Town in Estado de Táchira.
La Guaira: Town on coast of Distrito Federal.
La Pedrita: Near Uracoa, Estado de Monagas.
Laguna del Río Capatárida: Small lake at the mouth of the Río Capatárida.
Lagunillas: Town on east side of Lago de Maracaibo, Estado de Zulia.
Lagunillas: Town on Río Chama, Estado de Mérida.
Los Castillos: Town on Río Orinoco, below Ciudad Bolívar.
Los Monitos: Town near mouth of Río Limón, Estado de Zulia.
Macolla. (See under Punta.)
Macuto: Town on coast east of La Guaira, Distrito Federal.
Maracaibo: Large city at northern end of Lago de Maracaibo.
Maracaibo, Lago de: Largest lake of Venezuela, at northwestern end of country.
Maracay: City on shore of Lago de Valencia.
Margarita, Isla de: Island off northeast coast of Venezuela.
Maturín: Town in Estado de Monagas.

Mene Grande: Town east-central side of Lago de Maracaibo, Estado de Zulia.
Morón: Town 23 km. west of Puerto Cabello.
Motatán: Town on eastern side of Lago de Maracaibo.
Mucuchíes: Town on upper Río Chama, Estado de Mérida.
Noguera: Town probably in Valencia Basin.
Ocumare: Town on coast of Estado de Aragua.
Palmarejo: Town across channel from Maracaibo.
Pampán: Town 5 km. north of Trujillo, Estado de Trujillo.
Paraguaná, Península de: Peninsula in Estado de Falcón.
Pedernales: Town on Orinoco Delta at mouth of Caño Manamo.
Perijá, Sierra de (Río Coguollo): Mountain range north of Maracaibo Basin.
Petare: Town 13 km. east of Caracas.
Piedras Bay: Bay in the Gulf of Venezuela.
Pitch Lake. (See under Lago de Asfalto.)
Porlamar: Town on Isla de Margarita.
Pueblo Viejo: Town on east side of Lago de Maracaibo.
Puerto Cabello: Coastal town, Estado de Carabobo.
Punta Gorda: Point on east coast of Gulf of Venezuela.
Punta Jacuque: Point in Gulf of Venezuela.
Punta la Macolla: Point on Peninsula de Paraguaná.
Punta Salinas: Point in Gulf of Venezuela.
Punta Tigre: Point at mouth of Río San Juan, tributary of Golfo de Paria.
Quebradas. (See under ríos.)
Ríos, Caños, and Quebradas:
Agua Caliente: Southwestern end of Lago de Maracaibo.
Agua Caliente: 6 km. west of Puerto Cabello.
Albireggas (probably same as Barregas): Above Mérida (Río Chama system).
Alpargatón: 5 km. north of Morón, Estado de Yaracuy.
Amana: Tributary of Río Guanipa, Estado de Monagas.
Apón: About 35 km. south of Rosario, west side of Lago de Maracaibo.
Apure: Large river, tributary of Río Orinoco, in central Venezuela.
Atabapo: Tributary of Río Orinoco, near San Fernando de Atabapo, Colombian border.
Barregas: Tributary of Río Chama, below Egido, Estado de Mérida, south end of Lago de Maracaibo.
Borburata: Near Puerto Cabello.
Bue: Tributary of Lago de Valencia.
Cabriale (probably equals Cabrián): Valencia Basin, Estado de Carabobo.
Cambur, Caño: Southeast of Valencia in Valencia Basin.
Capatárida: Tributary of the Gulf of Venezuela, north coast, Estado de Falcón.
Caripe: At Caripito.
Caroní: Large tributary of Río Orinoco: its mouth is below Ciudad Bolívar.
Cassiquiare: Large branch of upper Río Orinoco, connecting with Río Negro.
Castaño: Valencia Basin.
Catatumbo: Largest river at southwestern end of Lago de Maracaibo.
Caura: Tributary of Río Orinoco.
Cerro Grande: 10 km. east of Macuto.
Chacaito, Quebrada: Eastern boundary of Distrito Federal.
Chama: Southern end of Lago de Maracaibo.
Chirgua: Tributary of Río Portuguesa.
Cobre: Tributary of Río la Grita below La Grita, Estado de Táchira (Catatumba system).

Cocuiza: Tributary of the Gulf of Venezuela, western boundary, Estado de Falcón.
Cogollo: Tributary of Río Apón, west side of Lago de Maracaibo.
Cojedes: Tributary of the Río Portuguesa.
Concha: Southwestern end of Lago de Maracaibo.
Coquenán. (See under Cuquenán.)
Coroni: Tributary of Río Orinoco.
Corozal: Small caño or stream between Uracoa and Río Tigre, Orinoco Delta.
Cumboto: Near Ocumare, on the coast of Estado de Aragua.
Cuquenán: Upper tributary of Río Caroni, with headwaters at Mt. Roraima.
Curiepe: At Higuerote, Estado de Miranda.
Cuyuni: Extreme eastern Venezuela, mouth at Georgetown, British Guiana.
Escalante: Southern end of Lago de Maracaibo.
Frío: Tributary of Río Uribante.
Gé, Quebrada la: Tributary of Río Palmar near Rosario, west side of Lago de Maracaibo.
González: Tributary of Río Chama at La González, Estado de Mérida.
Guaiguaza: 3 km. west of Puerto Cabello.
Guaire: At Caracas, Río Tuy system.
Guanare: Tributary of Río Portuguesa.
Guanipa: Empties into Golfo de Paria, west of Pedernales.
Guanoco, Caño de: Near mouth of Río San Juan, tributary of Golfo de Paria.
Guárico: Tributary of Río Apure, southeast of the Lago de Valencia Basin.
Irapa: At Irapa, on Golfo de Paria, Estado de Sucre.
Jimelles: Tributary of Río Motatán, east of Motatán, eastern side of Lago de Maracaibo.
La Grita: Estado de Táchira (Catatumbo system).
Limón: North of Maracaibo, tributary of El Tablazo.
Macarupano: 5 km. southeast of Carúpano, Estado de Sucre.
Machango: Small stream east side of Lago do Maracaibo, south of Lagunillas.
Mamo: 15 km. west of La Guaira.
Mánamo, Caño: Western channel of Orinoco Delta.
Manapire: Tributary of Río Orinoco.
Manzanares: Empties into Gulf of Cariaco, Estado de Sucre.
Marguanta (probably equals Maruanta): Tributary of Río Orinoco east of Ciudad Bolívar.
Meta: Large tributary of Río Orinoco running along south-central border of Venezuela.
Misoa: 20 km. south of Lagunillas, east side of Lago de Maracaibo.
Morichal Largo: Tributary of Caño Mánamo.
Motatán: Southeastern end of Lago de Maracaibo.
Negro: Tributary of Río Santa Ana, west side of Lago de Maracaibo.
Noguera: At Noguera, probably Valencia Basin.
Orinoco: Largest river of Venezuela, draining central and southern part of country.
Paito: Valencia Basin, southwest and south of Valencia.
Pájaros, de los: Southwestern end of Lago de Maracaibo.
Palmar: Western side of Lago de Maracaibo.
Pamplonita: Tributary of Río Zulia, Colombian and Venezuelan border,near Cúcuta, Colombia.
Pao: Tributary of Río Chirgua.

Paz: Valencia basin southwest of Valencia.
Porlamar: Isla de Margarita.
Portuguesa: Tributary of Río Apure.
Quiribana, Caño de: Near Caicara, on Río Orinoco below mouth of Río Apure.
Sagua, Caño de: About 25 km. north of Sinamaica, Estado de Zulia.
San Esteban: Near Puerto Cabello.
San Ignacio: 20 km. south of Rosario, western side of Lago de Maracaibo.
San Juan: South of Rosario, western side of Lago de Maracaibo.
San Juan: Tributary of Río Motatán, southeastern end of Lago de Maracaibo.
San Juan: Tributary of Golfo de Paria.
San Pablo: Caripito.
San Pedrito: 55 km. east of Barcelona, Estado de Sucre.
San Pedro: Tributary of Río Motatán, south of Mene Grande.
Sanchón: 5 km. west of Tavorda or west of Puerto Cabello, Estado de Carabobo.
Santa Ana: Large river western side of Lago de Maracaibo.
Sargento, Quebrada: Tributary of Río Limón, north of Maracaibo.
Socuy: Tributary of Río Limón, northwest of Maracaibo.
Suata: Tributary of Río Orinoco.
Tabor, Quebrada: Tributary of Río Motatán, 30 km. north of Trujillo.
Táchira: Tributary of Río Pamplonita, west of San Antonio, Estado de Táchira (Catatumbo system).
Tamanaco: At headwaters of Río Tinaco, Estado de Cojedes.
Tapa Tapa: Tributary of Lago de Valencia.
Tigre: Tributary of Río Morichal Largo.
Tinaco: Estado de Cojedes.
Tiquirito: Valencia Basin.
Tocuyo: Estado de Falcón.
Torbes: At Táriba, Estado de Táchira (Orinoco system).
Turmero: Valencia basin.
Tuy: Coastal river, Estado de Miranda.
Unare: Estado de Anzoategui.
Uracoa: Near Uracoa, west of Tucupita, Estado de Monagas.
Urana: 40 km. west of Puerto Cabello.
Uribante: Tributary of Río Apure, its mouth just northeast of Guasdualito.
Valle: Tributary of Río Guaire, just southeast of Caracas.
Yaracuy: 45 km. northwest of Puerto Cabello, in Estado de Yaracuy.
Yarapa. (See under Irapa.)
Yasa: Tributary of Río Negro, westernside of Lago de Maracaibo (Santa Ana system).
Yuruari: Extreme eastern Venezuela, tributary of Río Cuyuni, the mouth of which is at Georgetown, British Guiana.
Zulia: Tributary of Río Catatumbo.
Rosario: Town 95 km. southwest of Maracaibo.
Salina Rica: Marsh 5 km. north of Maracaibo.
Salinas, Bahía: Bay in Gulf of Venezuela.
Salinas. (See also under Punta.)
San Antonio: Town in Estado de Táchira.
San Carlos: Town in Estado de Cojedes.
San Casimiro: Town in Estado de Aragua.
San Cristóbal: Town in Estado de Táchira.
San Esteban: Town near Puerto Cabello.

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San Felipe: Town in Estado de Yaracuy, on Río Yaracuy.
San Félix: Town on western boundary of Estado de Falcón, near mouth of Río Cocuiza.
San Fernando de Apure: City just below mouth of Río Portuguesa, tributary of Río Apure.
San Fernando de Atabapo: Town on Colombian border.
San Román, Cabo: Cape at outer tip of Península de Paraguaná.
San Sebastián: Town in Estado de Aragua.
Santa Bárbara: Río Orinoco, southern Venezuela.
Santa Bárbara: Town near upper Río Amana, Estado de Monagas.
Santa Rosa, Salina: About 3 km. north of Maracaibo.
Sinamaica: Town near mouth of Río Limón, north of Maracaibo.
Soledad: Town across river from Ciudad Bolívar.
Tacarigua, Laguna de: Lake at coast, Estado de Miranda.
Táchira, Estácion: Town 60 km. north of San Cristóbal, Estado de Táchira.
Táriba: Town in Estado de Táchira.
Tavorda: Town 6 km. west of Puerto Cabello.
Tigre. (See under Punta.)
Tinaquilla: Town in Río Portuguesa drainage, Estado de Cojedes.
Totuma: An oil field about 100 km. southwest of Maracaibo near Río Palmar.
Trujillo: Town in Estado de Trujillo.
Tucacas: City on east coast of Estado de Falcón, about 60 km. northwest of Puerto Cabello.
Tucupita: Town on Caño Mánamo, Orinoco Delta.
Tulé, Lago: Lake about 75 km. west of Maracaibo, tributary of Río Socuy system.
Upata: Town about 125 km. east of Ciudad Bolívar.
Uracoa: Town in Estado de Monagas, west of Tucupita.
Valencia, Lago de: Large lake southeast of Puerto Cabello.
Valera: Town in Estado de Trujillo.

TAXONOMIC SECTION

Class ELASMOBRANCHII

Subclass SELACHII

Superorder SELACHOIDEA: Sharks and Rays

The sharks and rays may be distinguished from the bony fishes by the differences in the number of external gill openings, in sharks 5 to 7 on each side, whereas in the bony fishes there is a single external gill opening. The gills of bony fishes are covered by the operculum. The upper lobe of the caudal fin is longest.

The sharks of Venezuelan waters are fully described and keyed out to species in "Fishes of the Western North Atlantic" by Dr. H. B. Bigelow and William C. Schroeder (Mem. Sears Foundation Mar. Res. No. 1, pp. 59-576, figs. 6-106, 1948). It is not considered necessary here to report upon them in detail, since all my Venezuelan specimens were studied by those authors.

Order LAMNOIDEA

Suborder GALEOIDEA

Family ORECTOLOBIDAE: Nurse Sharks

Genus NEBRIUS Rüppell

Nebrius RÜPPELL, Neue Wirbelthiere, Fische, p. 62, 1835. (Genotype, *Nebrius concolor* Rüppell.) (Ref. copied.)

According to Fowler, U. S. Nat. Mus. Bull. 100, vol. 13, p. 67, 1941, *Ginglymostoma* Müller and Henle, 1837, is a synonym.

NEBRIUS CIRRATUS (Gmelin)

GATA

Squalus cirratus GMELIN, Systema naturae, vol. 1, p. 1492, 1788 (American seas) (ref. copied).

Ginglymostoma cirratum RÖHL, Fauna descriptiva de Venezuela, p. 365, fig. 178, 1942 (coast of Venezuela).

Family ISURIDAE: Mackerel Sharks; Tiburones

Genus LAMNA Cuvier

Lamna CUVIER, Le règne animal, vol. 2, p. 126, 1817. (Genotype, *Lamna cornubica* Cuvier=*Squalus cornubicus* Gmelin.) (Ref. copied.)

LAMNA NASUS (Bonnaterre)

PORBEAGLE; TIBURÓN CARITE

Squalus nasus BONNATERRE, Tableau encyclopédique ichthyologie, p. 10, pl. 85, fig. 350, 1788 (no locality) (ref. copied).

Isurus nasus RÖHL, Fauna descriptiva de Venezuela, p. 366, 1942 (coast of Venezuela).

Suborder SCYLIORHINOIDEA

Family GALEORHINIDAE: Gray Sharks; Tiburones

Genus SCOLIODON Müller and Henle

Scoliodon MÜLLER AND HENLE, Sitzb. Akad. Wiss. Berlin, 1837, p. 114. (Genotype, *Carcharias* [*Scoliodon*] *laticaudus* Müller and Henle.) (Ref. copied.)

SCOLIODON TERRAE-NOVAE (Richardson)

SHARP-NOSED SHARK

Squalus (*Carcharias*) *terrae-novae* RICHARDSON, Fauna Boreali-Americana, vol. 3, p. 289, 1836.

Carcharias (*Scoliodon*) *terrae-novae* METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 6, 1919 (Puerto Cabello, Venezuela).

U. S. N. M. No. 127098, 4 small specimens, Gulf of Venezuela, U. S. S. *Niagara*, December 1924.

U. S. N. M. No. 123221, a postembryo, 182 mm. in total length, Gulf of Venezuela, U. S. S. *Niagara*, 1925.

Genus GLYPHIS Agassiz

Glyphis Agassiz, Recherches sur les poissons fossiles, vol. 3, 243, 1843. (Genotype, *Glyphis hastalis* Agassiz.) (Ref. copied.)

GLYPHIS GLAUCUS (Linnaeus)

Great Blue Shark; Tiburón Azul

Squalus glaucus Linnaeus, Systema naturae, ed. 10, vol. 1, p. 235, 1758 (Europe.)
Prionace glauca Röhl, Fauna descriptiva de Venezuela, p. 364, fig. 176, 1942 (coast of Venezuela).

Genus GALEOCERDO Müller and Henle

Galeocerdo Müller and Henle, Sitzb. Akad. Wiss. Berlin, 1837, p. 115. (Genotype, *Squalus arcticus* Faber, *in* Müller and Henle.) (Ref. copied.)

GALEOCERDO CUVIER (Lesueur)

Tiger Shark; Leopard Shark; Tintorera

Squalus cuvier (Peron and Lesueur) Lesueur, Journ. Acad. Nat. Sci. Philadelphia, vol. 2, p. 351, 1822 (northwest coast of New Holland).
Galeocerdus maculatus Röhl, Fauna descriptiva de Venezuela, p. 365, fig. 177, 1942 (coast of Venezuela).

This species is *Galeocerdo arcticus* of authors.

Genus MUSTELUS Link

Mustelus Link, Mag. Phys. Naturg. Gotha, vol. 6, pt. 3, p. 31, 1790. (Genotype, *Squalus mustelus* Linnaeus.)

MUSTELUS CANIS (Mitchill)

Dog Shark; Cazón

Squalus canis Mitchill, N. Y. Lit. Philos. Trans., vol. 1, p. 486, 1815 (New York).
Mustelus canis Röhl, Fauna descriptiva de Venezuela, p. 364, 1942 (coast of Venezuela).

Family SPHYRNIDAE: Hammerhead Sharks

Genus SPHYRNA Rafinesque

Hammerhead Sharks; Pez martillo o cornuda

Sphyrna Rafinesque, Indice d'ittiologia siciliana, p. 60, 1810. (Genotype, *Squalus zygaena* Linnaeus.) (Ref. copied.)

SPHYRNA BIGELOWI Springer

Sphyrna bigelowi Springer, Journ. Washington Acad. Sci., vol. 34, pp. 274–276, figs. 1A–1D, 1944 (Uruguay and Brazil).

U.S.N.M. No. 123217, head only, measuring 230 mm. across greatest width, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

SPHYRNA ZYGAENA (Linnaeus)

Squalus zygaena Linnaeus, Systema naturae, ed. 10, vol. 1, p. 234, 1758 (Europe; America).
Sphyrna zygaena Röhl, Fauna descriptiva de Venezuela, p. 366, fig. 179, 1942 (coast of Venezuela).

Superorder HYPOTREMATA

Order BATOIDEA: Rays and Skates

This order includes those elasmobranch fishes that have a greatly depressed head and body, with the pectoral fins greatly expanded and continuous with the head and body, forming more or less of a disk. The five gill openings occur on the ventral or under side of the head, in front of which is the mouth. The snout is depressed and forms part of the disk or projects forward.

Suborder RAJIFORMES

Family PRISTIDAE: Sawfishes

This family is characterized by the presence of a long bladelike snout, the sides of which have large projecting "teeth" or spines set in a socket. In Venezuelan waters these number from 14 to 30 or a few more.

Genus PRISTIS Link

SAWFISHES, PEZ SIERRA

Pristis LINK, Mag. Phys. Naturg. Gotha, vol. 6, pt. 3, p. 31, 1790. (Type, *Squalus pristis* Linnaeus.)

KEY TO THE SPECIES OF PRISTIS REPORTED FROM VENEZUELA

1*a*. Teeth on each side of "saw" number 15 to 22; lower caudal lobe present; origin of first dorsal in front of pelvic insertion------**Pristis microdon** Latham

1*b*. Teeth on each side of "saw" number 24 to 32; lower caudal lobe absent; origin of first dorsal opposite pelvic insertion--**Pristis pectinatus** Latham

PRISTIS MICRODON Latham

Pristis microdon LATHAM, Trans. Linn. Soc. London, vol. 2, p. 280, pl. 26, fig. 4, 1794 (locality?).

Pristis perrotteti RÖHL, Fauna descriptiva de Venezuela, p. 366, fig. 180, 1942 (coast of Venezuela).

U. S. N. M. No. 27420, rostrum from Maracaibo.

PRISTIS PECTINATUS Latham

Pristis pectinatus LATHAM, Trans. Linn. Soc. London, vol. 2, p. 278, pl. 26, fig. 2, 1794 (in the ocean).

U. S. N. M. No. 121000, 1 specimen, Point Macolla, U. S. S. *Niagara*, April 19, 1925.

In addition, several saw blades of this species and of *Pristis microdon* were seen at the mouth of Caño de Sagua on the beach north of Sinamaica, where fishermen had left them.

The teeth on several blades of both species were counted, and it is interesting to note that frequently one or two more teeth occur on the

right side than on the left. I record my counts below, first for the left side then for the right, respectively:

For *microdon*, from the Río Tuyra, Panama: 20–21; 21–22; 19–19; 18–19; 21–23; 19–20; 20–20; 19–19; 17–18; 18–18; 19–20. Also from Lake Nicaragua: 18–18 and 15–15.

For *pectinatus*, from the Gulf of Venezuela: 28–29; from Lake Nicaragua 26–26; from Florida 25–25.

Family DASYATIDAE: Stingrays; Rayas

This family may be recognized by the presence of a "sting" or sharp serrated spine, sometimes two of them, on the dorsal surface of the tail. The pectoral fins are continuous with the snout in this family, the snout scarcely projecting or not projecting in front of the general outline of the disk-shaped body.

Many persons and some uninformed naturalists have the opinion that stingarees, as they are commonly called, do not have a poisonous sting. Those who have studied these fishes and have had personal experience with them are certain that the "sting" is highly venomous. Before I cite cases of persons who have been jabbed by the spine of a stingray, I shall acquaint the reader with these fishes and the nature of their sting or spines.

The stingaree is one of the rays, fishes related to the sharks and greatly resembling them in structure. In shape, however, they are flattened and disk-shaped and have a long tail. The rays, which bear a long sharp spine, usually in the middle upper part of the tail, are known as stingrays, a word corrupted to stingaree.

Several dozen species of stingrays are known to science. These creatures occur in all warm seas, as well as in many of the tropical rivers, some fresh-water stingrays in South America occurring even more than a thousand miles above the river mouth. Wherever stingrays occur—in the seas, bays, or in rivers—they are to be found hiding on the bottom in mud or sand. If disturbed, they swim with an undulating motion, usually close to the bottom, and stir up a cloud of mud, then come to rest on the bottom, the muddy cloud gradually settling around the ray. This "mud cloud" and the camouflaged coloration of the fish itself serve a definite purpose in concealing it. While thus partly buried in the sand or mud bottom the stingray is in perfect readiness to drive its sting into any unsuspecting victim that may step on it. The weight of a person stepping on the disk-shaped part of the body anchors the stingray, giving it the needed leverage to whip its tail upward with uncanny precision and drive the already erected spine or sting into its target. The sting on the powerful tail of even a small ray only a foot across in size can pass through a person's foot or into a leg bone.

During 1942 my assistant, Rafael Navarro, and I were collecting fishes in a swamp north of Sinamaica, Maracaibo Basin. We had walked nearly half a mile across this shallow muddy mire, pushing a small boat (cayuca) in front of us. Along the way we noticed many stingrays measuring up to a foot across their disks. The water was a few inches to a foot deep, and our feet sank as far into the soft muddy bottom. We made a fair collection of the various kinds of fishes present and started back. I urged Navarro not to pick up his feet in this mud but to push them forward at the surface to avoid stepping on a stringray.

Suddenly I heard him cry out in agony. A stingaree had driven its spine into his ankle, but fortunately the spine did not break off. When we reached shore I cleaned the wound, swabbed it out with iodine, and bandaged it. At camp that night I found the wound was deep, to the bone, but the flesh showed little swelling. I washed it and put on a larger bandage saturated with 1:1000 metaphen. After a week of this treatment the lesion was completely healed.

Since all stingarees hide, partly buried in the mud or sand of the bottom, they are always a potential danger to all who wade over such bottoms in tropical seas or in certain tropical rivers. Since the chief hazard is caused by stepping on one of these fishes it is almost completely eliminated by pushing one's feet along the bottom in the upper layer of mud or sand. Another method of avoiding the danger would be to carry a pole and probe the bottom as one walks forward. The moment something touches the ray it wiggles off.

KEY TO THE GENERA AND SPECIES OF DASYATIDAE REPORTED OR EXPECTED IN VENEZUELAN WATERS

1*a*. Outline of disk concave at each side of projecting snout, then rounded; greatest width of disk a little more than length of disk from tip of snout to its most posterior margin, not including pelvics; caudal fin moderately narrow, with its tip bluntly rounded; caudal fin with rays; eye and spiracle not quite equal to interorbital space; distance from front of oronasal groove to rear corner of nasal flap 2 in width of nasal flap; eye 2½ in interorbital space and 4¼ in length of snout; an irregular series of small tubercles or spines along middle of back behind interorbital space and on tail; color plain light brownish gray in alcohol____**Urotrygon venezuelae**, new species

1*b*. Outline of disk, at each side of snout rounded or nearly so, not concave; greatest width of disk less than length of disk from snout to its posterior margin, pelvics not included.

2*a*. Caudal fin broad, short, and bluntly rounded; greatest width of caudal fin nearly equal to width of nasal flap; caudal fin with rays; eye and spiracle much greater than interorbital space; distance from front of oronasal groove to outer rear corner of nasal flap about 2 times in width of nasal flap; eye large, equal to or greater than interorbital space and about 2 in the snout; no spines along middle of back and tail only small prickles; fourth gill slit a little closer to center of anus than to snout tip; color in

alcohol brown with numerous small white spots everywhere on dorsal surface (fig. 1)----------**Urobatis sloani** (Blainville)[1]

2*b*. Caudal fin narrow, long, and tapering to a point (end of tail usually missing in adults) and without rays; eye and spiracle about 1½ in interorbital space; distance from front of oronasal groove to corner of upper lip contained about 1⅔ in width of nasal flap; eye moderate about 2½ in interorbital space and 4 in snout; a series of rather strong spines along middorsal line of tail in front of sting; middle gill slit, about equidistant between tip of snout and center of anus; color in alcohol brownish or blackish dorsally, tail with bars or underside sometimes blotched; outer part of disk on ventral side grayish to brownish—fresh-water species. (*Potamotrygon.*)

3*a*. Coloration of ventral side of disk mottled with brownish; sides of tail in front of sting with regularly placed pale roundish to oblong spots and behind base of sting barred with pale spots (Amazon and Guianas)---------- **Potamotrygon hystrix** (Müller and Henle)

3*b*. Coloration of ventral side of disk plain pale, the margins of disk plain darkish to pale grayish, not mottled.

4*a*. Sides of tail in front of sting mottled but not with regularly placed pale or whitish oval spots; tail behind base of sting nearly plain black without definite pale bars (Magdalena, Atrato, and Maracaibo Basins)----------**Potamotrygon magdalenae** (Duméril)

4*b*. Sides of tail in front of sting with regularly placed pale or whitish oval to roundish spots; tail behind base of sting with distinct pale bars (Orinoco Basin)----------**Potamotrygon humboldtii** (Duméril)

Genus UROTRYGON Gill

Urotrygon Gill, Proc. Acad. Nat. Sci. Philadelphia, 1863, p. 173. (Genotype, *Urotrygon mundus* Gill, U.S.N.M. No. 7297, west coast of Central America.)

UROTRYGON VENEZUELAE, new species

Stingray; Raya de agua salada

Figure 2

Holotype.—U.S.N.M. No. 121966, a female measuring 255 mm. from tip of snout to tip of tail, collected by the U. S. S. *Niagara* in the Gulf of Venezuela at Point Macolla, April 19, 1925.

Description (of only known specimen).—Width of disk a little greater than the length of disk from tip of snout to its posterior margin not including pelvic; snout a little produced so that at each side of snout the outline is a little concave, then convex; outline of pelvic fins rounded, completing the circular outline of the disk; center of anus to tip of tail equal to distance from tip of snout to rear margin of pelvics; length of snout 3.4 in snout to center of anus; least interorbital width 2½ in snout; middle gill slit equidistant between tip of snout and center of anus; base of sting closer to tip of tail than to anus by twice diameter of eye; eye 2.4 in interorbital space, and about 5.7 in snout; caudal fin moderately narrow, the greatest height of caudal fin about equal to diameter of eye; interorbital space a little concave; back everywhere

[1] Not yet reported from Venezuelan waters.

covered with prickles; color in alcohol plain pale above and below, no spots anywhere, although specimen appears to be faded.

The following measurements, expressed in hundredths of the distance from tip of snout to tip of sting, 210 mm., were made: Width of disk 65.7; length of disk from snout tip to its rear edge not including pelvics 61.7; interorbital space 6.90; greatest interspiracular space 11.4

FIGURE 1.—*Urobatis sloani* (Blainville) (U.S.N.M. No. 4656) from Cuba, collected by Poey. Sketch by author.

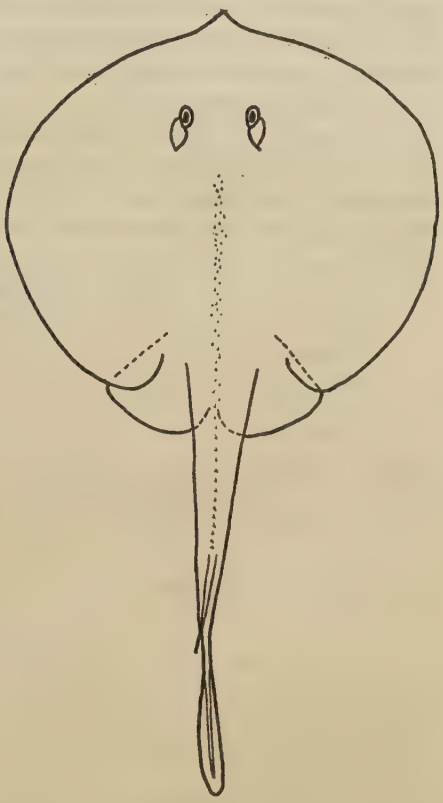

FIGURE 2.—*Urotrygon venezuelae*, new species: Holotype (U.S.N.M. No. 121966), female, 255 mm. in total length. Sketch by author.

and least interspiracular space 8.57; diameter of eye 2.86; length of oronasal groove from edge of upper lip to its anterior edge 2.95; length of snout 16.4; width across mouth 7.38; width of nasal flap 6.67; tip of snout to center of anus 56.2; anus to base of sting 32.4; anus to tip of sting 45.5; length of pelvics 12.6; anus to origin of the ventral fold of caudal fin 46.2; length of exposed part of sting 15.9; length of spiracle 3.95; greatest width of basal part of tail 8.10; snout tip to first gill slit 25.0; greatest height of caudal fin 3.19.

The following counts were made: Number of oblique rows of teeth from middle of jaw to outer edge, upper jaw 15, lower jaw 15; about 45 small spines along middle of back behind eyes and on middorsal side of tail.

Remarks.—This new species appears to be the Atlantic representative of *Urotrygon asterias* (Jordan and Gilbert) because it has in common with that species a characteristic and definite single row of enlarged spines along the middorsal line of the back and tail. *Urotrygon mundus* differs from *asterias* and *venezuelae* by not having the enlarged spines in a definite continuous row along the midline of the back; instead they are irregularly placed. Measurements made on the types of *U. asterias* are recorded along with those for *U. venezuelae* in table 1. It may be distinguished from *asterias* and from other American representatives of the genus *Urotrygon* by means of the key printed by Beebe and Tee Van (Zoologica, vol. 26, pt. 3, p. 264, 1941):

1*a*. A continuous series of greatly enlarged spines from behind orbits along midline of back and tail to base of sting; eye about 3.5 to 4 in snout (Pacific side of Central America)---------**Urotrygon asterias** (Jordan and Gilbert)

1*b*. Midline of back from behind orbits to just in front of base of tail with a very irregular series of slightly enlarged spines, these arranged in a continuous series on middorsal line of tail to base of sting; eye 5.7 in snout (Gulf of Venezuela)----------**Urotrygon venezuelae, new species**

TABLE 1.—*Measurements, expressed in hundredths of distance from tip of snout to tip of sting, made on two species of* Urotrygon

Characters	*venezuelae*	*asterias*		
	Holotype	Types: U.S.N.M. Nos.—		
		29542	28204	29580
Total length in millimeters	255	299	413	361
Length in millimeters from snout tip to end of sting	210	256	327	306
Greatest width of disk	65.7	65.6	69.1	68.6
Length of disk from snout tip to rear disk	61.7	62.5	64.6	62.1
Least interorbital space	6.90	6.84	6.46	6.54
Greatest distance between spiracles	11.4	10.7	11.3	10.8
Diameter of eye	2.86	3.24	3.83	3.98
Length of snout (tip to eye)	16.4	16.6	15.0	14.1
Length of oronasal groove (to nasal flap)	2.95	2.07	2.87	2.39
Width across lower jaw	7.38	6.37	6.24	6.54
Width of nasal flap	6.67	6.25	6.02	5.78
Length of pelvic fin (free outer edge)	12.6	10.9	10.5	10.6
Length of sting	15.9	18.0	16.1	16.8
Snout tip to center of anus	56.2	53.5	59.6	54.6
Center of anus to: Rear base of sting	32.4	34.8	32.1	33.6
Tip of sting	45.5	46.8	43.1	46.0
Origin of ventral fold on tail	46.2	43.8	40.0	40.9
Least interspiracular space	8.57	8.60	8.56	8.40
Width of base of tail	8.10	6.06	7.34	7.52
Snout to front edge of first gill slit	25.0	25.1	23.5	22.6
Greatest height or width of caudal fin	3.19	2.93	2.91	2.94
Distance from first gill slit to last	9.38	9.69	10.9	9.80
Width of first gill slit	1.90	1.56	1.77	1.70
Width of last gill slit	1.48	1.41	1.22	1.31

Genus POTAMOTRYGON Garman

Potamotrygon Garman, Proc. Boston Soc. Nat. Hist., vol. 19, p. 210, 1877. (Genotype, *Pastinaca humboldtii* Roulin designated by Eigenmann, The freshwater fishes of British Guiana, p. 116, 1912.)

Pastinaca Swainson (Natural history of fishes, amphibians . . ., vol. 1, p. 172, 1838), is not a synonym of the genus *Potamotrygon* Garman, as Swainson says: "*Pastinaca* Antiq. differs from *Trygon* only in having the tail entirely naked: the common sting ray of the Mediterranean is the type of this genus, to which we prefer retaining the name by which it was known to the ancients." *Pastinacae* Nardo, Giorn. Fisica de Pavia, vol. 1, p. 11, 1827, with genotype *Raja pastinaca* Linnaeus, is an older name according to Jordan (Genera of fishes, pt. 1, p. 121, 1917).

I have had for examination, in addition to the series listed from the Maracaibo Basin, two specimens from the Orinoco system, two from the Río Ampiyacu of the Peruvian Amazon, and one from the Río Magdalena. On these I have based my key. Because of the variability in body proportions I considered it advisable not to use the measurements. The coloration is so strikingly different for the specimens from the three drainage basins that I am able to distinguish the three species at a glance. The presence or absence of white blotches or black spots on the dorsal surface was so variable for the large series of specimens from the Maracaibo Basin that I cast serious doubt on those characters as of value in distinguishing the species referable to the genus *Potamotrygon*.

For detailed measurements made on specimens of *Potamotrygon*, see table 2.

POTAMOTRYGON HUMBOLDTII (Duméril)

Stingray; Raya de agua dulce

Pastenaque Humboldt, Roulin, Ann. Sci. Nat., vol. 16, pp. 104–107, pl. 3, figs. 1–3, 1829 (Upper Río Meta, Province San Martín at Giramena). (No binomial name given.)

Pastin[*aca*] *humboldtii*, Roulin, *in* Duméril, Histoire naturelle des poissons ou ichthyologie générale, vol. 1, p. 625, 1865.

Taeniura d'orbignyi Steindachner, Denkschr. Akad. Wiss. Wien, vol. 41, p. 159, 1879 (Ciudad Bolívar).

Trygon hystrix Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (Apure, Venezuela).—Sachs, Aus dem Llanos, 1879, p. 146 (Apure).—Röhl, Fauna descriptiva de Venezuela, p. 368, fig. 181, 1942 (Orinoco).

Potamotrygon hystrix Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 25, 1891 (Apure; Orinoco).—(in part) Fowler, Mus. Hist. Nat. Lima, 1945, p. 19 (Venezuela).

Potamotrygon d'orbignyi (in part) Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 25, 1891 (Orinoco, near Ciudad Bolívar).—Eigenmann, Reports Princeton Univ. Exped. Patagonia 1896–1899, vol. 3, pt. 4, p. 378, 1910 (Apure of Orinoco).

TABLE 2.—*Counts and measurements, expressed in hundredths of distance from tip of snout to tip of sting, made on species of* Potamotrygon

Characters	*magdalenae* (Maracaibo Basin)									*humboldtii*[1]		*hystrix*[2]	
	♀	♀	♀	♀	♂	♂	♂	♂	♂	♂	♂	♂	♀
Total length in millimeters	295	209	435	440	310	120	302	392	268	255	329		
Length in millimeters from tip of snout to end of sting	222	138	400	372	251	76	238	315	210	198	268	324	317
Greatest width of disk	57.7	54.4	53.7	54.3	53.8	60.5	54.6	54.3	52.4	57.6	64.6	59.8	62.2
Length of disk	63.0	59.1	60.0	60.2	60.6	65.1	61.0	58.8	60.0	62.6	66.0	64.2	64.6
Least interorbital space	8.56	9.06	7.50	7.26	7.57	10.5	7.78	7.30	7.62	7.58	7.94	6.79	8.67
Greatest distance between spiracles	12.8	13.0	11.5	11.6	12.0	15.1	11.8	11.7	12.4	12.1	11.7	11.7	12.1
Diameter of eye	3.15	3.62	3.00	2.95	3.19	3.55	3.36	3.49	3.82	4.75	3.46	3.70	3.94
Length of snout	16.2	15.9	14.0	14.3	15.5	16.5	15.5	14.0	15.2	16.4	17.2	16.2	15.8
Length of oronasal groove	4.50	3.62	5.00	4.04	4.38	3.95	4.41	4.13	4.28	4.04	3.95	4.10	4.20
Width across lower jaw	7.20	6.16	6.25	6.45	6.98	6.58	6.30	7.30	6.67	6.82	6.71	5.50	6.62
Width of nasal flap	6.98	6.08	5.75	5.92	6.48	5.92	5.46	5.88	6.20	6.36	6.27	6.17	6.52
Length of clasper					12.7	6.28	6.72	19.1	20.5	3.79	3.84	5.40	
Length of pelvic fin (free outer edge measured)	15.3	13.1	13.8	15.6	15.9	13.7	15.1	13.3	15.7	12.1	14.9	15.7	14.5
Length of sting (from anterior dorsal base to tip)	13.5	6.74	14.5	13.7	14.3		14.7	13.7	16.2	16.9	17.2	16.1	14.8
Snout to center of anus	53.2	50.8	51.0	51.0	52.2	57.9	51.3	51.1	49.5	53.0	53.7	53.0	56.1
Center of anus to: Rear base of sting	39.4	41.3	36.5	39.8	37.5	44.1	37.8	41.0	37.6	33.6	33.2	37.0	35.0
Tip of sting	47.3	47.8	46.0	46.8	47.8		48.0	49.0	49.0	46.7	46.0	47.8	45.7
Origin of ventral fold on tail	34.2	36.2	34.0	35.0	33.2	36.8	33.6	36.8	34.3	28.8	31.0	34.5	30.8
Number of oblique rows of teeth on upper jaw	23		21	30	23		22	26	22	18	20	13	15
Number of enlarged spines along middorsal line of tail	10	None	22	13	10	None	11	15	2	17	20	23	18+

[1] Ríos Guárico and Apure, respectively.
[2] Río Ampivacu, Peru.

One specimen, 255 mm. in total length, Río Guárico at El Sombrero, F. F. Bond, February 13, 1938.

One specimen, 329 mm. in total length, Río Apure at San Fernando de Apure, F. F. Bond, February 16, 1938.

POTAMOTRYGON MAGDALENAE (Duméril)

STINGRAY; RAYA DE AGUA DULCE

FIGURE 3

Taeniura magdalenae VALENCIENNES, *in* Duméril, Histoire naturelle des poissons ou ichthyologie générale, vol. 1, p. 625, 1865 (Río Magdalena).

Trygon hystrix (in part) MÜLLER AND HENLE, Systematische Beschreibung der Plagiostomen, p. 167, 1841 (Maracaibo).

Trygon (Trygon) hystrix (in part) DUMÉRIL, Histoire naturelle des poissons ou ichthyologie générale, vol. 1, p. 608, 1865 (L. Maracaibo).

Potamotrygon hystrix (in part) CAPORIACCO, Mon. Zool. Ital., vol. 46, No. 3, p. 56, 1935 (Maracaibo).

Potamotrygon magdalenae SCHULTZ, U. S. Naval Med. Bull., vol. 42, No. 3, p. 752, 1944 (Sinamaica, Venezuela).

U.S.N.M. No. 121665, 2 specimens, one, a female, 325 mm. in total length, gave birth to a postembryo 186 mm. in total length, Lago Tulé, about 75 km. west of Maracaibo, March 1, 1942.

U.S.N.M. No. 121659, 5 specimens, all males, 184 to 302 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21, 1942.

U.S.N.M. No. 121667, 5 specimens, ♂ 123 (postembryo) to 348 mm.; ♀ 330 and 450 mm., Río Negro below mouth of Río Yasa, March 2, 1942.

U.S.N.M. No. 121666, 2 specimens, ♂ 260 and ♀ 312 mm., Ciénaga del Guanavana, about 10 km. north of Sinamaica, March 11, 1942.

U.S.N.M. No. 121661, 1 specimen, ♂ 310 mm., Río Agua Caliente, 2 to 3 km. above Lago de Maracaibo, May 1, 1942.

U.S.N.M. No. 121662, 4 specimens, 2 embryos, ♂ 120 and ♀ 127 mm., ♂ 338 and ♀ 440 mm., Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6, 1942.

U.S.N.M. No. 121668, 9 specimens, ♂ 175 to 445 and 2 ♀ 202 and 235 mm., Río Apón, about 35 km. south of Rosario, February 26, 1942.

U.S.N.M. No. 121664, 5 specimens, embryos ♂ 205 and 230 mm., ♀ 195 and 209 mm., and adult ♀ 435 mm., Lago de Maracaibo near mouth of Río Concha, May 2, 1942.

U.S.N.M. No. 121660, 5 specimens, ♀ 158 to 295 mm., and one ♂ 325 mm. Río Machango at bridge south of Lagunillas, March 16, 1942.

U.S.N.M. No. 121663, 2 specimens, ♂ 302 and 392 mm., caño ½ mile west Sinamaica, March 11, 1942.

This species of stingray occurs abundantly in the rivers, ponds, caños, and lakes of the Maracaibo Basin on sandy to muddy bottoms, where it partially conceals itself by burying itself in the bottom. In this position it is a dangerous fish because when it is stepped on it can drive its poisonous sting with great force into a person's foot or leg. The Venezuelans greatly fear it because its sting not only produces excruciating pain but may cause death. The largest stingray that I saw was a female in the Río Machango. It measured a little over a foot across the disk.

This stingray does not appear to have been described very fully in the past, and for that reason the following descriptive comments are recorded, along with measurements in table 2.

The disk is a little longer than wide, evenly rounded; the tip of the snout has a little soft knoblike projection beyond the outline of the disk; the tail is longer than length of the disk, although the end of the tail is almost invariably missing except on the embryos, and therefore *total length means very little;* spiracles about size of eye and located just behind eyes; the space between the spiracles greater than inter-

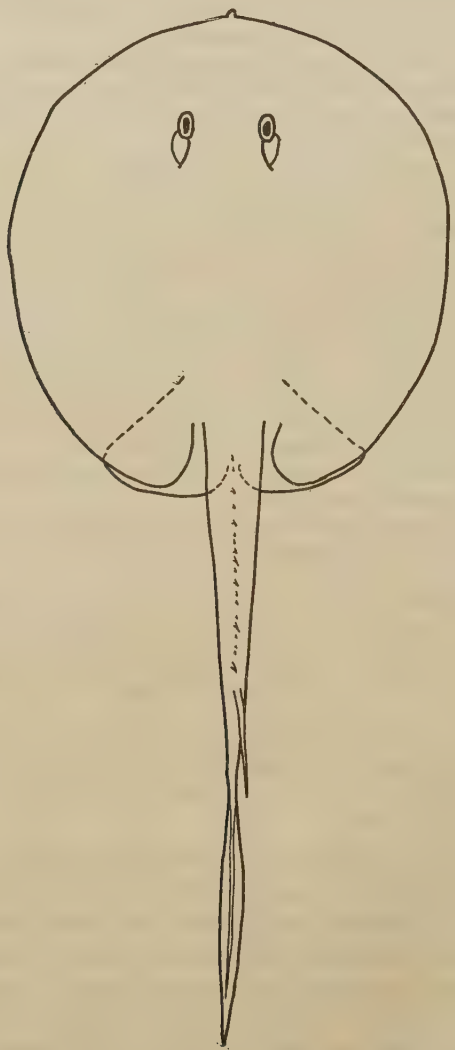

FIGURE 3.—*Potamotrygon magdalenae* (Duméril) (U.S.N.M. No. 121665), 325 mm. in total length, from Lago Tulé. Sketch by author.

orbital space, the latter about twice the length of the snout, interorbital space nearly flat; the mouth is a little closer to tip of snout than to front of the eye; inside the mouth there are always five blunt papillae on the lower jaw behind the teeth, the papilla in the midline a little in advance of the others, all four of which are in a straight line or nearly so; behind the teeth of upper jaw is a broad membrane whose inner margin has about 25 lappets; the nasal flap is free with a truncate fringed margin; the teeth are diamond-shaped with a posteriorly projecting blunt median tip, each side of which is a slight concavity; the greatest width of the toothed area of the upper jaw about two-thirds that of lower jaw; pelvic fins when spread with outer margins truncate or a little rounded, outer tips rounded; the claspers are variously developed at different sizes, the smallest specimen with fully developed claspers measures 210 mm. from tip of snout to end of sting and the diameter of the clasper was about 10 mm., its length 43 mm.; the spines along middorsal line of back in front of base of sting are absent on the embryos and postembryos but begin to appear at a length of about 200 mm. (from snout tip to end of sting) and the greatest number of such spines counted was 23; the sting when fully developed is about as long as the snout, fully barbed along its sides and with a lengthwise groove near base of the barbs that no doubt contains the poison glands and venom; the upper surfaces of the body are covered with minute scales and then in addition some specimens have numerous to few scattered stellate tubercles; under side of body naked.

Color.—Dorsal surface plain dark brown or dark brown with numerous scattered small black spots, and occasionally the dorsal surface has light blotches; ventral surface plain pale except rayed parts of pectorals, which are grayish to brownish, more intense around the margins, and sometimes a few black spots occur near margins of the disk; outer corners of upper lip sometimes darkish; under side of tail blotched or mottled; tail of young and postembryos somewhat faintly barred. When alive the under sides were purplish to pinkish.

Frequently when a female ray was placed in the collecting can it would give birth to one to four embryos.

Family MYLIOBATIDAE: Eagle and Cow-nosed Rays

This family may be recognized by the pectoral fins not being continuous to the end of the snout. They end on the side of the head behind the eyes, reappearing again in the front of the snout as one or two fleshy protuberances. The pectoral fins are pointed distally and the tail is long and whiplike with a spine basally.

Genus RHINOPTERA Kuhl

Rhinoptera Kuhl, *in* Cuvier, Le règne animal, ed. 2, vol. 2, p. 401, 1829. (Genotype, *Myliobatis marginatus* Geoffroy.) (Ref. copied.)

RHINOPTERA LALANDII Müller and Henle

Cow-nosed Ray

Rhinoptera lalandii Müller and Henle, Systematische Beschreibung der Plagiostomen, p. 182, 1841 (Brazil).

U.S.N.M. No. 123216, 1 specimen, 1,030 mm. in total length with length of disks 360 mm., Piedras Bay, U. S. S. *Niagara*, March 14, 1925.

U.S.N.M. No. 123219, head only, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

Genus AETOBATUS Blainville

Aetobatus Blainville, Bull. Soc. Philom. Paris, vol. 8, p. 120, 1816. (Genotype, *Raja narinari* Euphrasen, designated by Gill.) (Ref. copied.)

AETOBATUS NARINARI (Euphrasen)

Eagle Ray; Chucho

Raia narinari Euphrasen, Handl. Vet.-Akad. Stockholm, vol. 11, p. 217, pl. 10, 1790 (St. Bartholomieu, West Indies.) (Ref. copied.)

Aetobatus narinari Rohl, Fauna descriptiva de Venezuela, p. 369, fig. 182, 1942 (coast of Venezuela).

U.S.N.M. No. 123218, small head, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

Family MOBULIDAE

Genus MANTA Bancroft

Manta Bancroft, Zool. Journ., vol. 4, p. 144, 1828–29. (Genotype, *Cephalopterus manta* Bancroft.)

MANTA BIROSTRIS (Walbaum)

Devilray; Manta

Raja birostris Walbaum, Artedi's Bibliotheca ichthylogica, vol. 3, p. 535, 1792 (on *Diabolus marinus* Willughby).

Manta birostris Röhl, Fauna descriptiva de Veneuzela, p. 370, 1942 (coast of Venezuela).

This giant ray may be recognized by the presence of a pair of fleshy hornlike projections from the front of the snout that turn inward. The eyes occur laterally near the outer base of each of the two fleshy cephalic projections.

Suborder Narcobatoidea

Family TORPEDINIDAE: Electric Rays; Tembladores

This family of rays has a disk-shaped body that tapers posteriorly to a blunt thickish caudal fin; there are two small dorsal fins but no "sting" or spine on the tail. The disk-shaped part of the body lateral to and behind the eye is supplied with an electric gland capable of giving a powerful electric shock when it is touched.

Genus NARCINE Henle

Narcine Henle, Über Narcine, pp. 2, 31, 1834. (Genotype, *Torpedo brasiliensis* von Ölfers.) (Ref. copied.)

NARCINE BRASILIENSIS (Ölfers)

Electric Ray; Temblador de Agua Salada

Torpedo brasiliensis Ölfers, Die Gattung Torpedo, p. 19, pl. 2, fig. 4, 1831 (Brazil).
Narcine brasiliensis Röhl, Fauna descriptiva de Venezuela, p. 370, fig. 183, 1942 (coast of Venezuela; ? Río Mazanares).

Class OSTEICHTHYES

Subclass ACTINOPTERYGII

Superorder TELEOSTEI: Bony Fishes

This class includes the bony fishes, which have hard bones as contrasted with the elasmobranch fishes with a cartilaginous skeleton. There is but a single external gill opening, the gills being covered by an operculum.

Order ISOSPONDYLIOIDEA

Suborder CLUPEOIDEA

Family ELOPIDAE: Tarpons

KEY TO THE GENERA AND SPECIES REPORTED FROM VENEZUELA

1*a*. Scales about 42 or 43; gill rakers very numerous; dorsal branched rays about 10 or 11; anal branched rays about 18 or 19; last ray of dorsal fin filamentous ..... **Tarpon atlanticus** (Cuvier and Valenciennes)

1*b*. Scales small, 103 to 120 from upper edge of gill opening to midcaudal fin base; gill rakers on first gill arch 5 to 8+10 to 15; branched dorsal rays 17 to 20; branched anal rays 11 to 13; last dorsal fin ray not filamentous. **Elops saurus** Linnaeus

Genus TARPON Jordan and Evermann

Tarpon Jordan and Evermann, U. S. Nat. Mus. Bull. 47, pt. 1, p. 409, 1896. (Genotype, *Megalops atlanticus* Cuvier and Valenciennes.)

TARPON ATLANTICUS (Cuvier and Valenciennes)

Tarpon; Sábalo

Megalops atlanticus Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 19, p. 398, 1846 (Guadeloupe; San Domingo; Martinique; Porto Rico).
Tarpon atlanticus Röhl, Fauna descriptiva de Venezuela, p. 373, fig. 184, 1942 (coast of Venezuela).

Several specimens were seen rolling and diving in the Río Concha about 4 or 5 km. above Lago de Maracaibo. A large school was reported in Lago de Maracaibo at its northern end during April 1942.

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Genus ELOPS Linnaeus

Elops Linnaeus, Systema naturae, ed. 12, vol. 1, p. 518, 1766. (Genotype, *Elops saurus* Linnaeus.)

ELOPS SAURUS Linnaeus

Macabí

Elops saurus Linnaeus, Systema naturae, ed. 12, vol. 1, p. 518, 1766 (Carolina).

U.S.N.M. No. 121694, 6 specimens, 113 to 127 mm. in standard length, Salina Rica, 5 km. north of Maracaibo, in brackish water, February 20, 1942.

U.S.N.M. No. 121695, 1 specimen, 107 mm., Lago de Maracaibo at Maracaibo Yacht Club, February 27, 1942.

U.S.N.M. No. 121696, 1 specimen, 385 mm., Río Concha near mouth, May 2, 1942.

U.S.N.M. No. 121697, 3 specimens, 194 to 222 mm., Macolla Point, U. S. S. *Niagara*, April 19, 1925.

2 specimens, 22.5 and 57 mm., a bajo seco, east side of Puerto Cabello, F. F. Bond, January 26, 1938.

1 specimen, 28 mm., lagoons at Tucacas, 60 km. northwest of Puerto Cabello, F. F. Bond, January 29, 1938.

2 specimens, 19.5 and 20 mm., Río Barburata at mouth, Puerto Cabello, F. F. Bond, January 19, 1938.

Family ALBULIDAE: Ladyfishes

KEY TO THE GENERA AND SPECIES REPORTED FROM VENEZUELA

1*a*. Last dorsal and anal rays not elongate.....**Albula vulpes** (Linnaeus)
1*b*. Last dorsal and anal rays exceedingly prolonged..**Dixonina nemoptera** Fowler

Genus ALBULA Scopoli

Albula Scopoli, Natural history of fishes, p. 454, 1777. (Genotype, *Esox vulpes* Linnaeus.)

ALBULA VULPES (Linnaeus)

Bonefish; Macabí

Esox vulpes Linnaeus, Systema naturae, ed. 10, p. 313, 1758 (Bahamas).
Albula vulpes Röhl, Fauna descriptiva de Venezuela, p. 373, fig. 185, 1942 (coast of Venezuela).

U.S.N.M. No. 128265, 4 larval specimens, 33 to 44 mm. in standard length, Cape San Román, U. S. S. *Niagara*, April 2, 1925.

U.S.N.M. No. 128267, 1 specimen, 37 mm., Estanques Bay, U. S. S. *Niagara*, February 20, 1925.

Genus DIXONINA Fowler

Dixonina Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1910, p. 652. (Genotype, *Dixonina nemoptera* Fowler.)

DIXONINA NEMOPTERA Fowler

Dixonina nemoptera Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1910, p. 652 (Santo Domingo).—Myers, Copeia, 1936, No. 2, p. 83 (Puerto Cabello [not]

Curaçao [but Venezuela]).—Beebe, Zoologica, vol. 27, No. 8, p. 43, 1942 (Puerto Cabello).

Albula nemoptera Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 9, 1919 (Puerto Cabello).

Family CLUPEIDAE: Herrings; Sardines

Since there were not many specimens of this family in the collections from Venezuela I have not made a critical study of them. The key to the genera of Clupeidae reported from Venezuela was extracted from Storey (Stanford Ichthyol. Bull., vol. 1, No. 1, p. 14, 1938). Those who wish to identify the species in the genus *Harengula* should consult Storey (loc. cit.), pp. 24–25.

1*a*. Anal fin short, of fewer than 30 rays or the mouth is inferior; no distinct median notch in upper jaw.

2*a*. A bilobed dermal fold on anterior edge of cleithrum.

3*a*. Last 2 rays of anal fin much enlarged, almost forming separate finlets, third from last smaller than the one preceding it.

Sardinella Valenciennes

3*b*. Last 2 rays of anal fin scarcely enlarged, third from last not smaller than one preceding it; last ray of dorsal not produced.

Harengula Valenciennes

2*b*. No bilobed dermal fold on anterior edge of cleithrum; body strongly compressed; scales on base of caudal lobes; one pointed retrorse spine near proximal end of maxillary----------**Rhinosardinia** Eigenmann

1*b*. Anal fin long, of more than 32 rays; mouth never inferior.

4*a*. Pelvic fins absent; maxillary not adherent to premaxillary; no canines; anal origin in front of dorsal origin; maxillary tapering behind in adults extending to gill opening or beyond, but with rounded posterior end in the young at a standard length of about 40 mm. or shorter.

Odontognathus Lacepède

4*b*. Pelvic fins present.

5*a*. Maxillary adherent to premaxillary; canines present.

Chirocentrodon Günther

5*b*. Maxillary not adherent to premaxillary; no canines-**Neosteus**[6] Norman

Genus SARDINELLA Valenciennes

Sardinella Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 20, p. 261, 1847. (Genotype, *Sardinella aurita* Valenciennes, designated on p. 263, loc. cit.)

SARDINELLA ANCHOVIA Valenciennes

Sardina

Sardinella anchovia Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 20, p. 269, 1847 (Rio de Janeiro, Martinique).

The collection bearing U.S.N.M. No. 77962, 4 specimens, 96 to 138 mm. in standard length, made by H. B. Ritchie at Pompater, Margarita Island, appears to consist of market fish of this species. They are in bad condition, having had all gill arches and viscera removed.

[6] Not yet reported from Venezuela but undoubtedly occurring there.

Genus HARENGULA Valenciennes

Harengula VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 20, p. 277, 1847. (Genotype, *Harengula latulus* Valenciennes, designated on pp. 277, 281, loc. cit.)

For the identification of the species of *Harengula* see Storey's key (Stanford Ichthyol. Bull., vol. 1, No. 1, pp. 24–25, 1938).

HARENGULA CLUPEOLA (Cuvier)

SARDINE; SARDINA

Clupea clupeola CUVIER, Le règne animal, ed. 2, vol. 2, p. 318 footnote 2, 1829.

The following specimens were collected by the U.S.S. *Niagara* in the Gulf of Venezuela:

U.S.N.M. No. 128276, 5 specimens, 60 to 72 mm. in standard length, Amuay Bay, December 9, 1924.

U.S.N.M. No. 128277, 2 specimens, 32 and 57 mm., Jacuque Point, January 26, 1925.

U.S.N.M. No. 128279, 7 specimens, 45 to 56 mm., Salinas Bay, April 4–5, 1925.

U.S.N.M. No. 128278, 4 specimens, 32 to 38 mm., Estanques Bay, February 20, 1925.

HARENGULA MAJORINA Storey

Harengula majorina STOREY, Stanford Ichthyol. Bull., vol. 1, No. 1, pp. 25, 32, figs. 9, 12, 17, 1938 (Santos and Province of São Paulo, Brazil; St. Lucia, B. W. I.).

U.S.N.M. No. 128280, 4 specimens, 52 to 54.5 mm. in standard length, Salinas Bay, U.S.S. *Niagara*, April 4–5, 1925.

U.S.N.M. No. 128281, a specimen, 141 mm., is probably this species, taken in Estanques Bay, U.S.S. *Niagara*, December 8, 1924.

Genus RHINOSARDINIA Eigenmann

Rhinosardinia EIGENMANN, Mem. Carnegie Mus., vol. 5, p. 445, 1912. (Genotype, *Rhinosardinia serrata* Eigenmann.)

RHINOSARDINIA AMAZONICA (Steindachner)

Clupea amazonica STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 80, p. 65, 1879 (Amazon River at Pará).

Rhinosardinia amazonica FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 406, 1931 (Caño de Guanoco and Punta Tigre at mouth of San Juan River, Venezuela).

Genus ODONTOGNATHUS Lacepède

Odontognathus LACEPÈDE, Histoire naturelle des poissons, vol. 2, p. 221, 1800. (Genotype, *Odontognathus muricatus* Lacepède.)

ODONTOGNATHUS COMPRESSUS Meek and Hildebrand

Odontognathus compressus MEEK AND HILDEBRAND, Marine fishes of Panama, vol. 1, p. 194, pl. 11, fig. 2, 1923 (Fox Bay, Colon, Panama).

The following collections were made by the U.S.S. *Niagara* in the Gulf of Venezuela in 1925:

U.S.N.M. No. 128284, 6 specimens, 38 to 53 mm., in standard length, April 4.

U.S.N.M. No. 128285, 19 specimens, 25 to 105 mm., Jacuque Point, January 26.

U.S.N.M. No. 128282, 2 specimens, 67.5 and 68 mm., Cape San Román, April 2.
U.S.N.M. No. 128283, 9 specimens, 38.5 to 93 mm., Point Macolla, April 19.

Genus CHIROCENTRODON Günther

Chirocentrodon GÜNTHER, Catalogue of the fishes in the British Museum, vol. 7, pp. 382, 463, 1868. (Genotype, *Chirocentrodon taeniatus* Günther.)

CHIROCENTRODON BLEEKERIANA (Poey)

Pellona bleekeriana POEY, Repertorio fisico-natural de la isla de Cuba, vol. 2, p. 242, 1867 (Cuba).

U.S.N.M. No. 128275, 1 specimen, 50 mm. in standard length, from Point Macolla, Gulf of Venezuela, U.S.S. *Niagara*, April 19, 1925, was identified by Dr. Hildebrand.

Family ENGRAULIDAE: Anchovies; Anchoas

The recent excellent revision of this family by Dr. S. F. Hildebrand (Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, 1943) was indispensable in this study of the anchovies of Venezuela. During the several years that Dr. Hildebrand was preparing this revision he assembled in the U. S. National Museum one of the most complete collections of American anchovies to be found in any museum, including numerous types, cotypes, and paratypes. It gave me considerable pleasure to be able to add several thousand more specimens to this collection, among which were six known species and four undescribed ones, all collected by me in Venezuela during 1942.

I have followed Dr. Hildebrand's treatment of the Engraulidae to a large extent, deviating, however, in the anal-fin formula. Since the first three anal rays are unbranched I have represented them by lower-case Roman numbers followed by Arabic numerals for the branched rays, thus: iii,24. The first pectoral rays consist of two simple ones, followed by branched rays, the first pectoral ray being of paper thinness and lying close to the second. The dorsal consists of a minute simple ray, then two larger ones, followed by branched rays.

The following key to the genera of Engraulidae reported from Venezuela is somewhat modified from Dr. Hildebrand's in order to call attention to the greatly coiled condition of the intestine in *Cetengraulis*. *Engraulis* is omitted, since it has not as yet been found in Venezuela.

1*a*. Intestine with one main loop, without numerous coils below air bladder; gill membranes never broadly united across the isthmus, at most only a narrow delicate membrane anteriorly.

2*a*. Teeth in the jaws all small or minute, about equal in size.

3*a*. Origin of anal fin posterior to origin of dorsal fin, very rarely almost under it; gill rakers long, narrow, and numerous; body compressed, except in young; vertebrae 37 to 46, rarely 46.

4*a*. Maxillary long and slender, generally reaching well beyond joint of mandible, frequently nearly or quite to margin of opercle, more or less sharply pointed posteriorly.

5*a*. Gill rakers very close set, numerous, increasing in number with age, about 60 to 130 on lower limb of first arch in adults, as few as 35 or 40 in young; body deep, strongly compressed, depth in adults about 2.6 to 3.8 in standard length; attaining a standard length of 250 mm.---**Anchovia** Jordan and Evermann

5*b*. Gill rakers not very close set, less numerous, apparently not increasing in number with age, rarely as many as 32 on lower limb of first arch; body usually more elongate; some species very small, size not exceeding 150 mm. in stardard length.

Anchoa Jordan and Evermann

4*b*. Maxillary shorter, often rather broad, usually failing to reach joint of mandible, never reaching beyond it, square or broadly rounded posteriorly, never pointed; not exceeding 150 mm. in standard length.---**Anchoviella** Fowler

3*b*. Origin of anal fin in advance of origin of dorsal fin, or rarely under it; pelvic fin inserted about equidistant from base of pectoral and origin of anal.

6*a*. Origin of dorsal fin notably less than twice as far from tip of snout as from base of caudal; gill rakers short and broad, only about 14 on lower limb of first arch; anal with 29 to 33 [7] rays.

Pterengraulis Günther

6*b*. Origin of dorsal fin about twice as far from tip of snout as from base of caudal; gill rakers long, slender, and numerous, about 33 on lower limb of first arch in young (probably more numerous in adults); anal with about 25 rays.---**Hildebrandichthys,** new genus

2*b*. Teeth in the jaws, especially in the lower jaw, notably enlarged, usually unequal in size; origin of anal posterior to that of dorsal; pelvic inserted about midway between base of pectoral and origin of anal; size attained large, about 250 to 300 mm. in total length.

Lycengraulis Günther

1*b*. Intestine black, greatly coiled in posterior part of abdominal cavity, pyloric caeca black; gill membranes broadly united across isthmus in adults by a thin membrane, easily torn; gill rakers long and slender, close set, increasing in number with age, 25 to 60 on lower limb of first arch; pelvic fin insertion under or only a little in advance of dorsal origin, size attained up to at least 160 mm.---**Cetengraulis** Günther

Genus ANCHOVIA Jordan and Evermann

Anchovia Jordan and Evermann, U. S. Nat. Mus. Bull. 47, pt. 1, p. 449, 1896. (Genotype, *Engraulis macrolepidotus* Kner and Steindachner).

KEY TO THE SPECIES OF ANCHOVIA FROM VENEZUELA

1*a*. Origin of anal fin well in advance of a vertical line through middle of dorsal fin base; vertebrae 42 or 43; length of cheek about equal to snout and eye; pelvic fin inserted about equidistant from pectoral insertion and a vertical line through dorsal origin and of anal origin; greatest depth 3.3 to 3.7, and postorbital length of head 5.4 to 6.4, both in standard length; anal rays iii, 27 to iii, 32.---**Anchovia clupeoides** (Swainson)

[7] Dr. Hildebrand gives the range 27 to 35, but he informs me that the 27 is a typographical error and should be 29 as in his original data.

1*b*. Origin of anal fin nearly under middle of base of dorsal fin; vertebrae 39 to 41; length of cheek notably longer than snout and eye; pelvic fin insertion notably closer to a vertical line through dorsal origin than insertion of pectorals and nearer base of pectoral than anal origin; depth 3.5 to 4.2 and postorbital length of head 5.2 to 5.6 in standard length.

Anchovia nigra, new species

ANCHOVIA CLUPEOIDES (Swainson)

Engraulis clupeoides Swainson, The natural history and classification of fishes, vol. 2, p. 388, 1839 (Pernambuco, Brazil).

Engraulis productus Tortonese, Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 47, No. 89, p. 6, 1939 (Puerto Cabello, Venezuela).

Anchovia clupeoides Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 27, fig. 9, 1943 (Venezuela).

U.S.N.M. No. 121767, 60 specimens, 52 to 118.5 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, Gulf of Venezuela, March 12, 1942.

U.S.N.M. No. 127552, 2 specimens, 47 to 50 mm. in standard length, south coast Gulf of Venezuela, U.S.S. *Niagara*, November 15, 1925.

3 specimens, 72 to 81 mm., Laguna de Tacarigua, Estado de Miranda, F. F. Bond, November 11, 1939.

ANCHOVIA NIGRA, new species

Anchoa

Figure 4

Holotype.—U.S.N.M. No. 121761, 97 mm. in standard length, collected by Leonard P. Schultz in Lago de Maracaibo at Yacht Club, Maracaibo, Venezuela, February 27, 1942.

Paratypes.—All the paratypes were collected by Leonard P. Schultz in the Maracaibo Basin during 1942:

U.S.N.M. No. 121764, 3 specimens, 41 to 99.5 mm., from Lago de Maracaibo, 1 km. off Pueblo Viejo, April 7–8.

U.S.N.M. No. 121762, a specimen, 61 mm., Río Agua Caliente, 2 to 3 km. above Lago de Maracaibo, May 1.

U.S.N.M. No. 121763, 4 specimens, 39.5 to 51.5 mm., Lago de Maracaibo at Yacht Club, May 16.

U.S.N.M. No. 121766, 2 specimens, 81 and 92 mm., from Lago de Maracaibo near mouth of Río Concha, May 2.

U.S.N.M. No. 121765, 7,000 specimens, 12 to 66 mm., Río de Los Pájaros, 3 km. above Lago de Maracaibo, April 30.

A female at 99.5 mm. in standard length had her abdomen crowded with mature eggs on April 7–8, indicating that spawning time was near.

Description.—Certain measurements were made, and these data, recorded below, are expressed in hundredths of the standard length, first for the holotype, then for three paratypes in parentheses, respectively. Standard lengths in millimeters 97 (97.6; 55.5; 92).

Length of head 29.9 (31.3; 30.6; 30.5); greatest depth of body 28.9 (27.2; 26.1; 26.1); length of snout 4.64 (4.71; 4.50; 4.89); diameter of

eye 7.52 (8.20; 8.29; 8.05); distance from tip of lower jaw to rear of joint of mandible 20.1 (22.1; 20.5; 21.2); distance from tip of snout to rear of maxillary 22.5 (25.6; 25.6; 25.6); greatest width of interorbital space 7.02 (7.17; 7.57; 7.18); postorbital length of head 19.2 (19.1; 18.0; 19.1); length of cheek 13.8 (13.2; 12.2; 13.0); length of longest gill raker on first gill arch 6.70 (8.00; 6.84; 8.15); length of longest ray of dorsal fin — (13.2; 15.5; 14.6); of anal fin 12.5 (—; 13.9; 13.3); of pectoral fin 14.4 (14.3; 16.6; 14.9); of pelvic fin 7.22 (6.97; 8.10; 7.28); of lower lobe of caudal fin 23.4 (26.6; 26.1; 26.7); shortest midcaudal fin ray 9.28 (8.91; 11.7; 9.13); length of base of anal fin 27.7 (26.8; 30.1; 28.5); length of base of dorsal fin 11.3 (12.5; 11.0; 10.9); distance from pelvic insertion to anal origin 17.5 (18.5; 15.1; 16.3); tip of snout to dorsal origin 52.6 (56.3; 53.3; 52.6); snout to anal origin 60.3 (62.0; 56.6; 62.0); snout to pectoral insertion 30.0 (30.7; 30.6; 31.0); snout to pelvic insertion 44.6 (46.1; 42.9; 46.2); length of caudal peduncle or distance from base of last anal ray to midcaudal fin base 16.5 (15.4; 16.4; 15.4); least depth of caudal peduncle 11.2 (10.8; 11.7; 11.2).

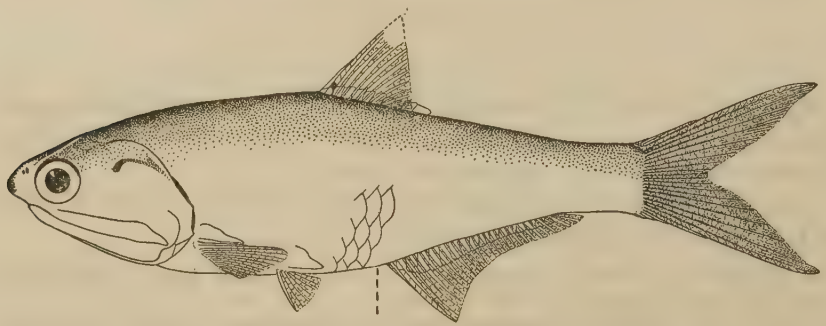

FIGURE 4.—*Anchovia nigra*, new species: Holotype (U.S.N.M. No. 121761), 97 mm. in standard length. Drawn by Mrs. Aime M. Awl.

The following counts were made, respectively: Dorsal rays iii, 11 (iii, 11; iii, 11; iii, 11); anal rays iii, 28 (iii, 27; iii, 28; iii, 29); pectoral fin rays ii, 12–ii, 12 (ii, 12–ii, 12; ii, 11–ii, 12; ii, 11–ii, 11); pelvic rays always i, 6; scale rows from upper edge of gill opening to midcaudal fin base 42 (41; 44; 43). Additional counts are recorded in table 3.

TABLE 3.—*Counts made on species of* Anchovia *from Venezuela*

Species	Number of anal fin rays								Number of vertebrae				
	iii, 25	iii, 26	iii, 27	iii, 28	iii, 29	iii, 30	iii, 31	iii, 32	39	40	41	42	43
clupeoides	----	----	1	2	3	8	3	1	----	----	----	11	5
nigra	1	8	8	9	2	----	----	----	2	11	3	----	----

Body compressed, deep, greatest depth about 3.5 to 4.2, and head about 3.3 to 3.5, both in standard length; depth of head at joint of mandible much less than postorbital length of head; head longer than greatest depth of body; snout bluntly pointed, projecting more than half its length beyond mandible, shorter than eye, scarcely longer than pupil, contained 5¼ to 5¾ in head; eye 3.4 to 4.2 in head; maxillary ending in a triangular point, extending to or a little past joint of mandible, contained about 1.3 or 1.4 in head; mandible pointed, not curved upward at tip, reaching a vertical line through rear edge of posterior nostril when mouth is closed; teeth most minute but very numerous along edges of both jaws, often obsolete in adults; cheek 6.6 to 7.1 and postorbital length of head 5.2 to 5.6 in standard length; gill rakers very long and slender and very numerous, increasing in number with increase in length or age; depressed length of dorsal fin 1.5 to 2 in head; the first branched rays of dorsal fin reaching a little past tips of last rays when the fin is depressed; distal margin of dorsal fin truncate or a little concave; caudal fin deeply forked; distal margin of anal fin a little concave, first anal rays longest; first upper ray of pectoral fin longest, tips of pectoral fins reaching past the insertion of pelvics, sometimes to opposite nearly halfway toward tips of pelvics in young specimens; pelvic fins reaching halfway to anal origin in young but scarcely halfway to anus in adults; dorsal fin origin equidistant between midcaudal fin base and front half of eye; origin of anal fin under middle of base of dorsal fin; axillary scale of pectoral extending out about halfway to tip of pectoral fin; intestine with one main loop.

Coloration.—In alcohol the adults are straw-colored dorsally, silvery on sides, with a dark brownish streak along middorsal line of back; inside of gill cavity blackish ventrally opposite region of maxillary; all fins translucent-whitish except caudal fin, which is dusky with the black pigment cells more intense on distal part of rays; peritoneum silvery but intestine blackish. In the young a silvery lateral band about as wide as eye anteriorly becomes narrower posteriorly. The most characteristic mark is a small black speck at lower base of caudal fin, with a small cross of X-shaped lines of black pigment more or less embedded; base of anal fin with black pigment spots; tip of snout blackish; middle basal part of each lobe of caudal fin more intensely pigmented than remainder of caudal fin; otherwise coloration is similar to that in adult specimens.

Remarks.—This new species would, with some exceptions, trace down through Dr. Hildebrand's key (1943, p. 21) to *A. rastralis*, but it differs from that Pacific species in having 39 to 41 (usually 40) vertebrae instead of 41 or 42. From *A. clupeoides* it may be separated by the key on page 38. Named *nigra* in reference to the black pigmentation on inside of the gill cavity.

Genus ANCHOA Jordan and Evermann

Anchoa JORDAN AND EVERMANN, Proc. California Acad. Sci., ser. 4, vol. 16, No. 15, p. 501, 1927. (Genotype, *Engraulis compressus* Girard.)

KEY TO THE SPECIES OF ANCHOA REPORTED FROM VENEZUELA [8]

1*a*. Anal fin with iii, 14 to iii, 22 rays.

2*a*. Gill rakers on lower limb usually 16 to 26, and upper limb 13 to 21.

3*a*. Origin of anal under middle or a little behind middle of base of dorsal fin; cheek short and broad, usually not much longer than eye; depth about 5.0 to 5.75 and postorbital length of head 6.3 to 6.9, both in standard length; maxillary short, reaching only to joint of mandible, not sharply pointed, 1.3 to 1.5 in head; anal rays iii, 15 to iii, 19.

Anchoa ginsburgi Hildebrand

3*b*. Origin of anal fin far behind middle of base of dorsal fin, somewhere under its posterior third and rarely behind base of dorsal; cheek longer and narrower, generally notably longer than eye; anal rays iii, 17 to iii, 22; dorsal fin when depressed usually with first rays extending to or beyond tip of last depressed ray; depth 5.0 to 6.0 in standard length; origin of anal under or slightly behind base of last dorsal ray; silvery lateral band as wide as eye.. **Anchoa lyolepis** (Evermann and Marsh)

2*b*. Gill rakers 22 to 33 on lower limb and 17 to 23 on upper limb of first arch.

4*a*. Origin of anal generally under posterior third of base of dorsal fin; cheek short and broad, scarcely longer than eye; axillary scale of pectoral about ¾ length of that fin and 1.9 to 2.7 in head; dorsal origin about equidistant between midcaudal fin base and middle of eye; maxillary not sharply pointed posteriorly, its upper free margin rounded, reaching to or slightly beyond joint of mandible; anal rays iii, 15 to iii, 19; gill rakers 18 to 22 + 24 to 28..... **Anchoa tricolor** (Agassiz)

4*b*. Origin of anal about under middle of dorsal fin base, sometimes slightly behind middle; depth 4.5 to 5.0, anal base 3.8 to 4.8, both in standard length; maxillary long, sharply pointed, extending nearly to margin of opercle except in the young, 1.2 to 1.35 in head; gill rakers 17 to 20 + 23 to 27; anal rays iii, 18 to iii, 22.

Anchoa parva (Meek and Hildebrand)

1*b*. Anal rays iii, 23 to iii, 37; gill rakers on first gill arch 14 to 19 + 16 to 22; anal fin base 2.8 to 3.4 in standard length; axillary scale of pectoral broad reaching nearly to or a little past midlength of that fin, 2.4 to 3.6 in head.

5*a*. Origin of dorsal fin notably closer to midbase of caudal fin than to tip of snout; posterior margins of operculum broadly convex, figure 8*a*; tips of pectorals not quite reaching to pelvic insertions; cheek as long as eye and half snout; scales about 38 to 42; anal rays iii, 24 to iii, 29.

Anchoa trinitatis (Fowler)

5*b*. Origin of dorsal fin notably closer to tip of snout than to midbase of caudal fin; posterior margin of operculum truncate or slightly concave, figures 5, 8, *b*; tips of pectorals reaching well past pelvic insertions; cheek much longer, equal to eye and twice snout; scales about 45 to 48.

6*a*. Anal rays iii, 29; caudal fin with posterior margin not blackish; tip of dorsal not blackish..... **Anchoa argenteus**, new species.

6*b*. Anal rays iii, 33 to iii, 38; caudal fin with posterior margin blackish; usually tip of dorsal blackish.

Anchoa spinifer [9] (Cuvier and Valenciennes).

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[8] Extracted from Hildebrand's key to *Anchoa*.

[9] Not yet reported from Venezuela.

ANCHOA GINSBURGI Hildebrand

Anchoa ginsburgi Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 55, fig. 20, 1943 (Gulf of Venezuela).

The following specimens were collected by the U. S. S. *Niagara* in the Gulf of Venezuela in 1925:

Holotype, U.S.N.M. No. 119788, Estanques Bay, February 20.

Paratypes as follows:

U.S.N.M. Nos. 119789, 1 specimen, and 127608, 7 specimens, both lots bearing same data as holotype.

U.S.N.M. No. 127609, 3 specimens, Salinas Bay, April 4–5.

U.S.N.M. No. 127610, 4 specimens, Jacuque Point, January 26.

ANCHOA LYOLEPIS (Evermann and Marsh)

Stolephorus lyolepis Evermann and Marsh, Bull. U. S. Fish Comm., vol. 20, p. 89, fig. 13, 1902 (Culebra, Puerto Rico).

Anchoa lyolepis Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 65, fig. 25, 1943 (Gulf of Venezuela).

The specimen reported by Dr. Hildebrand bears U.S.N.M. No. 127623 and is from Point Macolla, Gulf of Venezuela.

ANCHOA TRICOLOR (Agassiz)

Engraulis tricolor Agassiz, *in* Spix and Agassiz, Selecta genera et species piscium . . . Brasiliam . . . , p. 51, pl. 23, fig. 1, 1829 (Bahia, Pará).

Anchoa tricolor Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 74, fig. 30, 1943 (? Gulf of Venezuela).

The specimen from Amuay Bay recorded by Dr. Hildebrand does not seem to be in the national collections. Both of the first gill arches were destroyed, according to his original data, and thus the specimen measuring 63 mm. in total length was referred to *A. tricolor* with much doubt. I have not seen any specimens of this species from Venezuela, and for identification the number of gill rakers must be known.

ANCHOA PARVA (Meek and Hildebrand)

Anchoa

Anchovia parva Meek and Hildebrand, Marine fishes of Panama, vol. 1, p. 202, 1923 (Porto Bello, Panama).

Anchoa parva Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 83, fig. 35, 1943 (Venezuela).

Anchoa januaria (in part) Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 81, fig. 34, 1943 (Gulf of Venezuela).

U.S.N.M. No. 121772, 18 specimens, 35 to 42 mm. in standard length, Río de Los Pajaros, 3 km. above Lago de Maracaibo, April 30, 1942.

U.S.N.M. No. 121768, 7,000 specimens, 11 to 59 mm., Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 121770, a specimen, 21.5 mm., Lago de Maracaibo at Yacht Club, March 5, 1942.

U.S.N.M. No. 121771, a specimen, 24 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121774, 37 specimens, 29 to 34 mm., Lago de Maracaibo, 2 miles off Lagunillas, March 15, 1942.

U.S.N.M. No. 121773, 13 specimens, 16 to 33 mm., caño at Los Monitos, Estado de Zulia, Río Limón system, March 11, 1942.

U.S.N.M. No. 121769, 41 specimens, 23 to 44 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

One specimen, 35 mm., Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

I have carefully examined the two collections from the Gulf of Venezuela referred by Dr. Hildebrand to *Anchoa januaria*, U.S.N.M. Nos. 127675 and 127676, from Amuay and Salinas Bays, respectively. I found that the gill raker count of U.S.N.M. No. 127675 in one specimen was 18+24 and that the other two specimens had their first arches destroyed, which explains the fact that they were not counted by Dr. Hildebrand, who has been most cooperative in letting me use his original data. One specimen in U.S.N.M. No. 127676 has 17+26 gill rakers, but the others have 12 on the upper arch and numerous small, sharp-pointed teeth in both jaws and a short maxillary with rounded posterior end. I am therefore referring them to *Anchoviella blackburni*. Thus, the range of *A. januaria* must again be restricted to Brazil.

The following counts were made on specimens from Venezuela. Anal rays iii,18 in 4, iii,19 in 9, iii,20 in 6, and iii,21 in 9 specimens; pectoral rays i,11 in 2, i,12 in 4, and i,13 in 4; vertebrae 39 in 1 and 40 in 11 specimens; on 3 specimens the gill rakers were as follows: 18+1+27; 18+1+26; 19+1+26; 17+1+25; 18+1+23; and 18+1+25. The dorsal fin had ii,13 rays in 2 specimens counted.

ANCHOA TRINITATIS (Fowler)

FIGURE 6, *a*

Anchovia trinitatis FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 67, p. 527, fig. 3, 1915 (Trinidad).

Anchoa trinitatis HILDEBRAND, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 96, fig. 40, 1943 (coast of Venezuela).

The following specimens were identified tentatively as belonging to this species:

U.S.N.M. No. 121778, 3 specimens, 44.5 to 66 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 119812, 3 specimens, 50 to 56 mm., Laguna de Tacarigua, Estado de Miranda, Venezuela, collected by Dr. F. F. Bond, February 3, 1939.

From same collection as U. S. N. M. No. 119812, 15 specimens, 44 to 54 mm.

The following counts were made: Anal rays iii,25 in 3; iii,26 in one; iii,27 in 2; and iii,29 in 2; dorsal rays iii,11 in 3 and iii, 12 in 2; pectoral

rays ii,12–ii–12; ii,13–ii,13; gill rakers 16+1+20; 17+1+20; vertebrae 40: 40; scales 40 in one, 41 in 3.

ANCHOA ARGENTEUS, new species

FIGURES 5, 6, *b*

Holotype.—U.S.N.M. No. 121777, only known specimen, 97 mm. in standard length, collected by Leonard P. Schultz in Lago de Maracaibo 1 km. off Pueblo Viejo in gill net, April 7–9, 1942.

Description.—Certain measurements were made on the holotype, and these data expressed in hundredths of the standard length are recorded in table 4 along with similar data on other species.

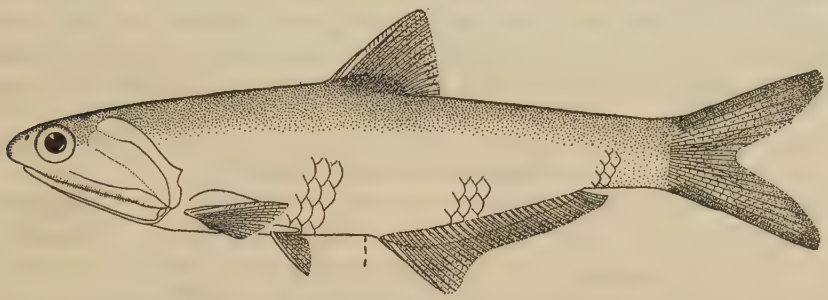

FIGURE 5.—*Anchoa argenteus*, new species: Holotype (U.S.N.M. No. 121777), 97 mm. in standard length. Drawn by Mrs. Aime M. Awl.

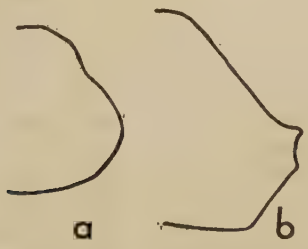

FIGURE 6.—Outline of opercular margin of: *a*, *Anchoa trinitatis* (Fowler) (U.S.N.M. No. 123222); *b*, *Anchoa argenteus*, new species (U.S.N.M. No. 121777). Sketches by author.

The following counts were made: Dorsal rays iii, 13; anal iii, 29; pectorals ii,12–ii, 12; pelvics i,6–i,6; scale rows from upper edge of gill opening to midbase of caudal fin 47; gill rakers on first gill arch 15+1+18.

Body compressed, somewhat elongate, greatest depth about 4.3, head rather long, 3.8, both in standard length; depth of head at joint of mandible slightly greater than postorbital length of head; head longer than greatest depth of body, snout bluntly pointed, projecting much more than half its length beyond tip of mandible, shorter than eye, a little longer than pupil, contained about 6.75 in head; eye 4⅔

in head; maxillary ending in an elongate triangular point, extending past joint of mandible but not past rear margin of operculum, contained 1.1 in head; mandible bluntly pointed, a trifle curved upward at tip, reaching a little in front of a vertical line at front of nostrils, when mouth is closed; small numerous teeth along margin of both jaws; villiform teeth on vomer, palatines, and pterygoids; cheek 7.2, postorbital length of head 5.75, in standard length; gill rakers rather long, flattened and somewhat broadened at tips, with denticles on their inner edges; depressed length of dorsal fin 1.3 in head, the first branched rays reaching past last ones, when depressed; distal margin of dorsal fin truncate; distal margin of anal somewhat concave; the first anal rays longest; simple ray of pectorals longest; tips of pectoral rays reaching well past the pelvic insertions; pelvics reaching a little more than halfway to anal origin; dorsal fin origin closer to tip of snout than midbase of caudal fin by a little more than length of snout;

TABLE 4.—*Measurements made on certain species of* Anchoa *and recorded in hundredths of the standard length*

Characters	*spinifer*		*argenteus*	*trinitatis*	
	Gulf of Paria		L. de Maracaibo	Colombia	Venezuela
Standard length in millimeters	131	101	97	71.5	65
Length of head	25.9	26.7	26.6	24.0	26.9
Greatest depth of body	26.3	25.5	23.0	25.4	25.7
Length of snout	4.04	4.18	4.12	4.90	6.00
Diameter of eye	5.95	6.14	6.19	7.40	8.46
Length of mandible (from tip of chin)	19.2	20.2	20.4	17.1	18.5
Length of maxillaries (from tip of snout)	24.4	25.8	25.3	22.4	24.9
Greatest width of bony interorbital space	5.12	5.74	5.67	5.87	7.38
Postorbital length of head	17.4	17.4	17.7	12.9	14.3
Length of cheek	12.7	12.9	13.2	8.80	9.84
Longest gill raker	3.05	4.85	3.82	3.64	3.38
Length of longest fin ray of:					
Dorsal	22.0	19.2	17.3	----	----
Anal	14.8	14.5	12.9	----	----
Pectoral	21.4	20.2	14.6	16.6	----
Pelvics	9.77	9.32	8.35	9.08	8.92
Caudal	23.7	----	23.2	----	----
Shortest caudal fin ray	11.2	11.2	9.80	----	----
Length of base of anal	37.6	35.7	32.1	34.3	32.0
Length of base of dorsal	11.8	12.3	12.8	12.0	10.9
Distance pelvic insertion to anal origin	17.5	14.6	15.6	17.5	15.7
Snout tip to dorsal origin	44.7	49.7	48.9	55.4	55.7
Snout tip to anal origin	56.9	56.4	56.7	58.3	62.0
Snout tip to pectoral insertion	26.2	28.2	28.7	25.7	29.2
Snout tip to pelvic insertion	42.8	42.6	41.9	43.6	46.2
Length of caudal peduncle	12.4	14.1	13.7	13.7	12.6
Least depth of caudal peduncle	10.7	11.4	10.9	11.0	10.3
Length of pectoral axillary scale from pectoral insertion to tip of scale	9.54	11.9	11.9	9.09	10.0

origin of anal fin under a vertical line through middle of length of dorsal fin base; axillary scale of pectoral extending out about halfway to tip of pectoral fin; upper posterior margin of operculum truncate or nearly so, the lower posterior corner angular with short concave edge, figure 6, *b*, length of base of anal fin 3.2 in standard length.

Coloration.—In alcohol, the back is straw colored with considerable dark pigmentation; these pigment cells extend over middle of front of snout but sparsely; the lower two-thirds of sides of body are silvery; dark pigment cells are numerous basally on dorsal fin becoming fewer distally and wholly lacking on outer third of fin; outer margins of caudal fin darkish, but middle of caudal fin and its distal parts nonpigmented; anal, pectoral, and pelvic fins nonpigmented.

Remarks.—This new species would trace down through Dr. Hildebrand's key to the species of *Anchoa* on pp. 29–30 of his revision of the Engraulidae to his section "C" for *Anchoa spinifer*. However, *A. argenteus* differs from *spinifer* in having fewer anal rays, iii,29 instead of iii,33 to iii,38, and the posterior margin of caudal and tip of dorsal fin are not blackish as in *spinifer*. From the local Venezuelan species of *Anchoa* it may be separated by the key on page 42.

Named *argenteus* in reference to the brilliant silvery lower sides.

Genus ANCHOVIELLA Fowler

Anchoviella Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 211, 1911. (Genotype, *Engraulis perfasciatus* Poey.)

KEY TO THE SPECIES OF ANCHOVIELLA FROM VENEZUELA [10]

1*a*. Origin of anal entirely behind base of dorsal fin, generally under or behind tip of last dorsal ray when depressed; gill rakers on first arch 24 to 28 + 27 to 33; eye small, 4.4 to 4.8 in head and 2.5 to 2.75 in postorbital part of head; anterior rays of dorsal reaching past tip of last ray when fin is depressed; gill rakers as long as eye, broad and close set, with minute serration on inner edge ..... **Anchoviella estauquae** Hildebrand

1*b*. Anal origin under posterior half of base of dorsal fin; gill rakers on first arch 16 to 18 + 23 to 26; pectoral fin with 12 or 13 rays; maxillary reaching ¾ diameter of eye beyond orbit; cheek as long as eye; eye 3.2 to 3.5 in head; axillary scale of pectoral short, extending to or somewhat beyond midlength of that fin 2.4 to 2.9 in head; median dark stripe posterior to anal fin ..... **Anchoviella guianensis** (Eigenmann)

1*c*. Origin of anal fin under or in advance of middle of dorsal fin base.

2*a*. Gill rakers 10 to 12 + 15 to 17; depth 4.8 to 5.5; head 4.0 to 4.6, both in standard length; anal rays iii,22 to iii,26; vertebrae 42 or 43, two specimens dissected ..... **Anchoviella blackburni** Hildebrand

2*b*. Gill rakers 28 to 34 + 36 to 45; depth 3.5 to 3.9 in adults, head 3.5, both in standard length; anal rays iii,21 to iii,23 ..... **Anchoviella pallida** (Starks)

ANCHOVIELLA ESTAUQUAE Hildebrand

Anchoviella estauquae Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 115, fig. 48, 1943 (Estanques, misspelled "Estauques" Bay, Gulf of Venezuela).

[10] Extracted from Hildebrand's key to *Anchoviella*.

U.S.N.M. No. 119795, holotype, Estanques Bay, U. S. S. *Niagara* February 20, 1925.

U.S.N.M. No. 119796, 3 paratypes bearing same data.

ANCHOVIELLA GUIANENSIS (Eigenmann)

Stolephorus guianensis EIGENMANN, Mem. Carnegie Mus., vol. 5, p. 447, pl. 62, fig. 5, 1912 (Bartica Rocks, British Guiana).

Anchoviella guianensis FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 406, 1931 (Caño de Guanoco, Venezuela).—HILDEBRAND, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 123, fig. 52, 1943 (Venezuela).

ANCHOVIELLA BLACKBURNI Hildebrand

Anchoviella blackburni HILDEBRAND, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 129, fig. 57, 1943 (Estanques (not "Estauques") Bay and Jacuque Point, Gulf of Venezuela).

U.S.N.M. No. 121775, 1 specimen, 37 mm. in standard length, mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 127606, a paratype, Estanques Bay, U. S. S. *Niagara*, February 20, 1925.

U.S.N.M. No. 119794, 9 paratypes, Jacuque Point, U. S. S. *Niagara*, January 26, 1925.

U.S.N.M. No. 121776, 3 specimens, 31.5 to 33.5 mm., Salinas Bay, U. S. S. *Niagara*, April 4, 1925.

67 specimens, 18 to 22 mm., lagoons 15 km. north of Maracaibo, F. F. Bond, April 6, 1938.

The following counts were made: Anal iii, 23 in 2 specimens; pectoral rays ii, 14–ii, 14; gill rakers 12+1+17 in 3 specimens and 12+1+18 and 12+1+16 in 1 each, vertebrae 42 in 1 specimen.

ANCHOVIELLA PALLIDA (Starks)

Anchovia pallida STARKS, The fishes of the Stanford expedition to Brazil, p. 9, pl. 1, 1913 (Pará, Brazil).

Anchoviella venezuelae FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, pp. 406–407, fig. 6, 1931 (Caño de Guanoco, mouth of Río San Juan, Venezuela).

Anchoviella pallida HILDEBRAND, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 134, fig. 59, 1943 (Caño de Guanoco, Venezuela, to Pará, Brazil).

Genus PTERENGRAULIS Günther

Pterengraulis GÜNTHER, Catalogue of the fishes in the British Museum, vol. 7, p. 398, 1868. (Genotype, *Clupea atherinoides* Linnaeus.)

The genus lacks gill rakers on the posterior side of the first two gill arches, the third may have a few on the upper limb, whereas the fourth arch has a full set of rakers on its posterior side. The anal origin is notably in advance of a vertical line through dorsal origin.

PTERENGRAULIS ATHERINOIDES (Linnaeus)

Clupea atherinoides LINNAEUS, Systema naturae, ed. 12, vol. 1, p. 523, 1766 (Surinam) (ref. copied).

Pterengraulis atherinoides FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 83, p. 407, 1931 (Caño de Guanoco, Venezuela).—HILDEBRAND, Bull. Bingham

Oceanogr. Coll., vol. 8, art. 2, p 139, fig. 63, 1943 (Caño de Guanoco and Río Apure, San Fernando de Apure, Venezuela).

6 specimens, 18 to 27 and 143 mm., Río Apure at San Fernando de Apure, F. F. Bond, February 16, 1936.

HILDEBRANDICHTHYS, new genus

The characters of the genus are those of the genotype.

Genotype: *Hildebrandichthys setiger*, new species.

HILDEBRANDICHTHYS SETIGER, new species

FIGURE 7

Holotype.—U.S.N.M. No. 121779, only known specimen, 31.5 mm. in standard length, collected near mouth of Caño de Sagua, about 25 km. north of Sinamaica, by Leonard P. Schultz, March 12, 1942.

Description.—The following measurements are expressed in hundredths of the standard length for the holotype: Length of head 32.8; greatest depth of body 22.6; length of snout 6.23; diameter of eye 8.85;

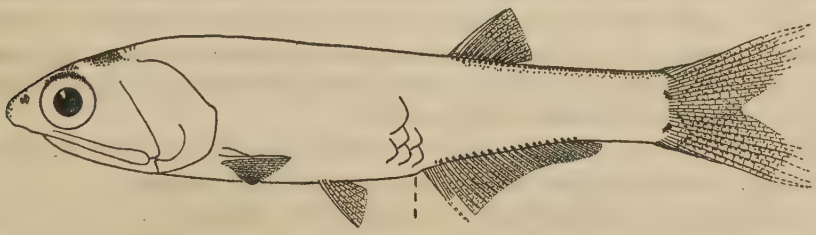

FIGURE 7.—*Hildebrandichthys setiger*, new genus and species: Holotype (U.S.N.M. No. 121779), 31.5 mm. in standard length. Drawn by Mrs. Aime M. Awl.

length of mandible or from tip of lower jaw to rear edge of joint of mandible 18.3; distance from tip of snout to rear of maxillary 23.0; width of interorbital space 6.56; postorbital length of head 18.3; length of cheek 10.5; length of longest gill raker 6.56; longest ray of dorsal fin 10.8; of pectoral fin 11.2; of pelvic fin 8.85; shortest mid-caudal fin ray 11.5; length of anal fin base 23.9; length of dorsal fin base 9.50; distance from pelvic insertion to anal origin 16.4; tip of snout to dorsal origin 70.2; snout to anal origin 65.6; snout to pectoral insertion 35.2; snout to pelvic insertion 49.8; length of caudal peduncle or distance from base of last anal fin ray to midbase of caudal fin 18.0; least depth of caudal peduncle 10.8.

The following counts were made: Dorsal rays ii, 10; anal rays iii, 22; pectoral rays i, 14–i, 15; pelvic rays i, 6–i, 6; and scale rows from upper edge of gill opening to midbase of caudal fin 43.

Head 3.15 and depth 4.5 in standard length; body somewhat compressed, its greatest depth through pectoral fins; depth of head at joint of mandible a little greater than postorbital length of head; snout shorter than eye, nearly 9.2 in head; eye 3.7 in head; maxillary

short, its posterior tip rounded, not quite reaching to joint of mandible; length of maxillaries about 1.7 in head; eye contained nearly 1.2 in the length of cheek; postorbital length of head 5.6 and mandible 5.6 both in standard length; gill rakers rather broad and moderately long in the young holotype; distal margin of dorsal fin truncate, when dorsal fin is depressed the first rays do not quite reach to tips of last rays; origin of dorsal fin behind that of anal fin a distance equal to pupil and equidistant between midbase of caudal fin and ⅔ of eye behind the head; anal fin base 4.2 in standard length and notably closer to rear of head than midcaudal fin base; pelvic insertion midway between pectoral insertion and anal origin; distal margin of anal fin a little concave; pelvic fins reaching halfway to anal origin and pectoral fins reaching three-fourths the way to pelvic insertion; axillary scale of pectoral reaching not quite halfway to tips of pectorals; caudal fin deeply forked.

Coloration in alcohol.—Some dark pigment cells along midline of back and in two rows along dorsal fin base and thence posteriorly; anal fin base with black pigment cells; top of head brown with a few dark cells on upper surface of snout; caudal fin with dark pigment a little more intense on upper and lower margins and a black speck at midbase of each caudal fin lobe; silvery lateral band not developed in the small type specimen, but operculum is silvery.

Remarks.—The key on page 38 separates *H. setiger* from *P. atherinoides*. See table 5 for counts made on the two species.

Named *setiger* in reference to its numerous gill rakers.

Genus LYCENGRAULIS Günther

Lycengraulis GÜNTHER, Catalogue of the fishes in the British Museum, vol. 7, pp. 385, 399, 1868. (Genotype, *Engraulis grossidens* Cuvier.)

KEY TO THE SPECIES OF LYCENGRAULIS REPORTED FROM VENEZUELA [11]

1*a*. Gill rakers 13 to 20+18 to 25 on first arch; origin of dorsal usually about equidistant from midcaudal fin base and posterior margin of eye; pectoral rays 14 to 16; origin of dorsal equidistant between midbase of caudal fin and posterior half of eye or a little behind eye.

2*a*. Vertebrae 43 to 45, usually 43 or 44; anal rays iii, 22 to iii, 28; greatest depth 3.85 to 4.4 (in adults) in standard length; maxillary sharply pointed posteriorly, reaching well beyond joint of mandible, sometimes nearly to margin of opercle, usually 4.8 to 5.3 in standard length.

Lycengraulis grossidens (Cuvier)

2*b*. Vertebrae 41 or 42, rarely 42; anal rays usually iii, 20 to iii, 24; depth 4.3 to 4.9; maxillary not sharply pointed, more rounded at tip, reaching to or a little past joint of mandible, about 5¼ to 5⅔ in standard length.

Lycengraulis limnichthys, new species

1*b*. Gill rakers 9 to 13+12 to 15 on first arch; cheek long and narrow, notably longer than snout and eye, 2.0 to 2.25 in head; body quite slender, the depth 5.25 to 6.0 in length; maxillary reaching nearly or quite to joint of mandible, 5.5 to 5.8 in length; origin of dorsal notably nearer base of caudal than eye; vertebrae 47; anal rays iii, 23 to iii, 25; pectoral rays 13 or 14.

Lycengraulis batesii (Günther)

[11] Modified after Hildebrand.

TABLE 5.—*Counts recorded for* Pterengraulis[1] *and* Hildebrandichthys

Species	Number of anal fin rays											Number of gill rakers on first gill arch							
	iii, 22	iii, 23	iii, 24	iii, 25	iii, 26	iii, 27	iii, 28	iii, 29	iii, 30	iii, 31	iii, 32	10 + 13	10 + 14	10 + 15	11 + 13	11 + 14	12 + 14	12 + 15	13 + 16	22 + 15
P. atherinoides	----	----	----	----	2	----	9	6	2	1	1	3	7	1	1	5	2	2	1	----
H. setiger	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1

[1] The counts for all but four specimens of *P. atherinoides* were kindly furnished me by Dr. Samuel F. Hildebrand from his original notes accumulated during his studies of the American Engraulidae. I take this opportunity to express my gratitude to him for this and other help furnished.

TABLE 6.—*Counts made on species of* Lycengraulis *from Venezuela*

Species	Anal rays							Vertebrae					Dorsal rays		Pectoral rays		
	iii, 20	iii, 21	iii, 22	iii, 23	iii, 24	iii, 25	iii, 26	41	42	43	44	45	iii, 12	iii, 13	i, 13	i, 14	i, 15
grossidens	----	----	----	1	3	4	1	----	1	7	3	1	1	6	2	10	14
limnichthys	1	4	10	14	4	1	----	14	1	----	----	----	4	2	3	16	2

LYCENGRAULIS BATESII (Günther)

Engraulis batesii GÜNTHER, Catalogue of the fishes in the British Museum, vol. 7, p. 399, 1868 (Río Pará).—HILDEBRAND, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 148, fig. 67, 1943 (Rio Apure at San Fernando de Apure, Venezuela).

U.S.N.M. No. 119814, 2 specimens, 42.5 and 62.5 mm. in standard length, from Río Apure, San Fernando de Apure, F. F. Bond, February 16, 1938.

From same collection as U.S.N.M. No. 119814, 8 specimens, 20 to 70 mm.

LYCENGRAULIS LIMNICHTHYS, new species

FIGURE 8

Holotype.—U.S.N.M. No. 121751, 92 mm. in standard length, collected by Leonard P. Schultz on May 1, 1944 in the Río Agua Caliente, 2 to 3 km. above Lago de Maracaibo, Venezuela.

Paratypes.—All paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121752, 59 specimens, 40 to 128 mm. in standard length, collected along with the holotype and bearing same data.

U.S.N.M. No. 121756, 1 specimen, 117 mm., taken in gill net, in Lago de Maracaibo, 1 km. off Pueblo Viejo, April 7–9.

U.S.N.M. No. 121758, 6 specimens, 88 to 118 mm., from Lago de Maracaibo at Yacht Club, Maracaibo, May 16.

U.S.N.M. No. 121753, 40 specimens, 24 to 121 mm., from Lago de Maracaibo near mouth of Río Concha, May 2.

U.S.N.M. No. 121757, 84 specimens, 20 to 80 mm., from the Río de Los Pájaros, 3 km. above Lago de Maracaibo, April 30.

U.S.N.M. No. 121755, 1 specimen, 24 mm., from a pool in drying-up Río San Ignacio about 20 km. south of Rosario, February 26.

U.S.N.M. No. 121754, 2 specimens, 32 and 34.5 mm., off dock at Lagunillas in Lago de Maracaibo, April 14.

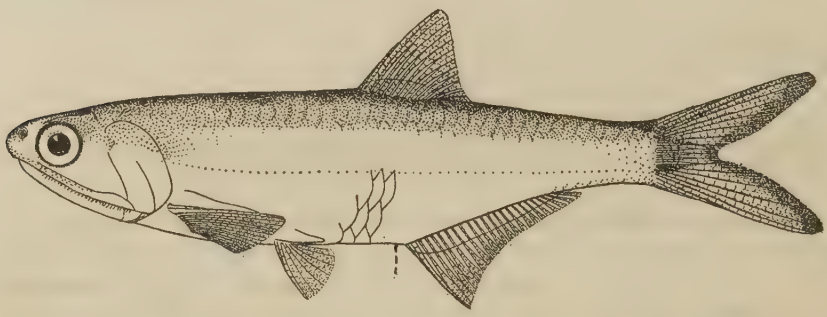

FIGURE 8.—*Lycengraulis limnichthys*, new species: Holotype (U.S.N.M. No. 121751), 92 mm. in standard length. Drawn by Mrs. Aime M. Awl.

Description.—Certain measurements were made, and these data, recorded below, are expressed in hundredths of the standard length, first for the holotype, then for two paratypes in parentheses, respectively. Standard lengths in millimeters 94.0 (48.1; 118.5).

Length of head 27.7 (25.6; 25.2); greatest depth of body 23.6 (20.8; 22.1); length of snout 4.78 (4.16; 4.47); diameter of eye 6.70 (7.69; 6.07); distance from tip of lower jaw to rear of joint of mandible 18.2 (16.6; 18.0); distance from snout tip to rear of maxillary 21.6 (19.7; 21.1); greatest width of interorbital 5.64 (6.03; 5.06); postorbital length of head 16.0 (14.3; 15.3); length of cheek 10.1 (8.11; 10.5); length of longest gill raker on first gill arch 3.08 (4.36; 2.45); length of longest ray of dorsal fin 16.0 (15.4; 14.1), of anal fin 13.3 (12.9; —), of pectoral fin 19.1 (18.7; 17.3), of pelvic fin 9.56 (10.4; 8.69), and of lower lobe of caudal fin 27.1 (25.8; —); shortest midcaudal fin ray 7.76 (9.59; 7.34); length of base of anal fin 24.5 (24.1; 22.4); length of base of dorsal fin 11.2 (11.2; 13.0); distance from pelvic insertion to anal origin 19.9 (18.3; 20.5); tip of snout to dorsal origin 54.8 (53.2; 54.4); snout to anal origin 62.4 (60.9; 59.9); snout to pectoral insertion 27.4 (27.4; 24.7); and to pelvic insertion 44.2 (42.6; 38.4); length of caudal peduncle 18.8 (18.3; 19.0); least depth of caudal peduncle 10.0 (9.77; 10.1).

The following counts were made, respectively: Dorsal rays iii, 12 (iii, 12; iii, 12); anal rays iii, 22 (iii, 22; iii 22); pectoral rays ii, 14-ii, 15 (ii, 13–ii, 14; ii, 14–ii, 14); pelvic rays always i, 6; scales 42 (42; 43).

Body compressed, rather slender, its greatest depth 4.3 to 4.9; depth of head at joint of mandible about four-fifths of postorbital

length of head; head notably longer than greatest depth of body, nearly 4 times in standard length; snout bluntly rounded, projecting less than half its length beyond tip of mandible, shorter than eye, and contained 5.5 to 6 times in head; eye 3 to 4.2 times in head; maxillary slender, not notably pointed, extending to or a little past joint of mandible, 1.3 to 1.4 in head; mandible pointed, curved slightly upward at tip, reaching a little past a vertical line through front of anterior nostril; teeth in lower jaw variable in size, usually 18 to 24 enlarged, the enlarged ones of upper jaw more numerous; cheek longer than snout and eye, about 2.3 to 2.4 in head in specimens longer than 85 mm.; postorbital length of head 6.5 to 7.2 in standard length; gill rakers slender, usually 16 to 18+20 to 23 on first arch; height of dorsal fin about equal to postorbital length of head, its distal margin a little concave; distal margin of anal a little concave; first branched ray of pectoral fin longest, reaching to or a little past insertion of pelvics; pelvic fins not reaching quite halfway to anal origin; caudal fin deeply forked, the lower lobe a little longer and stronger than upper lobe; origin of dorsal fin usually equidistant between midcaudal fin base and rear margin of pupil; origin of anal fin under bases of fifth to seventh branched rays of dorsal fin or a little behind middle of base of dorsal fin; axillary scale of pectoral about three-fourths length of pectoral fin.

Color.—The color of preserved specimens in alcohol is grayish above with a dark streak along middle of back; margin of caudal fin with a narrow blackish band; interradial membranes of caudal fin lobes with black pigment, especially intense between the third and fourth from middle on lower lobe and fourth and fifth from middle on upper lobe, the middle rays between almost unpigmented; middle of snout with black pigment; upper edge of maxillaries anteriorly with black pigment; inner side or opercle heavily pigmented; peritoneum silvery; silvery lateral band present and as wide as snout and eye over region of anal fin origin.

Remarks.—This new species is so distinct that it does not resemble any form known at present. It is as slender as *L. olidus* but has 41 (rarely 42) vertebrae instead of 46 to 48. *L. grossidens* has 43 or 44 (rarely 45) vertebrae and a much greater depth of body than *L. limnichthys*. In Hildebrand's review of the American anchovies (1943, pp. 141–142), it would trace down to a new section in his key, *ddd* on p. 141. It may be distinguished from other Venezuelan anchovies by the key on page 50.

The smallest female observed with fully mature eggs, apparently ready for deposition, was 75 mm. in standard length and came from the Río Agua Caliente.

Named *limnichthys* in reference to its occurrence in a lake.

LYCENGRAULIS GROSSIDENS (Cuvier)

Engraulis grossidens Cuvier, *in* Spix and Agassiz, Selecta genera et species piscium . . . Brasiliam . . ., p. 50, pl. C, 1829 (Rio de Janeiro).
Engraulis janeiro Spix, *in* Spix and Agassiz, Selecta genera et species piscium . . . Brasiliam . . ., pl. 24, fig. 1, 1829.
Lycengraulis grossidens Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, fig. 64, 1943 (Gulf of Venezuela).

U.S.N.M. No. 121759, 9 specimens, mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 127620, 8 specimens, 31 to 142 mm., off south coast of the Gulf, U. S. S. *Niagara*, November 15, 1925.

U.S.N.M. No. 121760, 2 specimens, 26.5 to 52 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

Genus CETENGRAULIS Günther

Cetengraulis Günther, Catalogue of the fishes in the British Museum, vol. 7, p. 383, 1868. (Genotype, *Engraulis edentulus* Cuvier.)

CETENGRAULIS EDENTULUS (Cuvier)

Engraulis edentulus Cuvier, Le règne animal, vol. 2, p. 323, 1817; ed. 2, vol. 2, p. 323, 1829 (Jamaica) (ref. copied).
Cetengraulis edentulus Hildebrand, Bull. Bingham Oceanogr. Coll., vol. 8, art. 2, p. 155, fig. 71, 1943 (Gulf of Venezuela).

U.S.N.M. No. 121780, 165 specimens, 27.5 to 66 mm. in standard length, the mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 127677, 2 specimens, 56 and 64.5 mm., Amuay Bay, Gulf of Venezuela, P. P. Blackburn, of the U. S. S. *Niagara*, December 9, 1924.

U.S.N.M. No. 127682, 1 specimen, 72 mm., from south coast, Gulf of Venezuela, P. P. Blackburn, of the U. S. S. *Niagara*, November 15, 1925.

The intestine is greatly coiled in both *edentulus* and *mysticetus* and should prove to be a character of generic significance in this family. The intestine and peritoneum are generally black.

The following counts were made on the Venezuelan specimens: 41 vertebrae in 4 specimens and 42 in 1; anal rays iii,20 in 1, iii,21 in 2, and iii,22 in 6 specimens.

Suborder Salmoniformes

Family SALMONIDAE

Genus SALMO Linnaeus

Trout

Salmo Linnaeus, Systema naturae, ed. 10, p. 308, 1758. (Genotype, *Salmo salar* Linnaeus.)

SALMO GAIRDNERII Richardson

Rainbow trout; Trucha de arco iris

Salmo gairdnerii Richardson, Fauna Boreali-Americana, vol. 3, p. 221, 1836 (Columbia River at Fort Vancouver, North America).

U.S.N.M. No. 121693, 1 specimen, 35 mm. in standard length, from the Upper Río Chama above Mucuchíes, Estado de Mérida, March 28, 1942.

The rainbow trout introduced into the mountain streams of Venezuela some years ago appears to have become established there in rather limited numbers.

Suborder INIOMOIDEA

Family SYNODONTIDAE: Lizardfishes

Genus SYNODUS Scopoli

Synodus SCOPOLI, Introductio historiam naturalem, p. 449, 1777. (Genotype, *Esox synodus* Linnaeus.) (Ref. copied.)

SYNODUS FOETENS (Linnaeus)

LIZARDFISH; PEZ LAGARTO

Salmo foetens LINNAEUS, Systema naturae, ed. 12, p. 513, 1766 (South Carolina).

U.S.N.M. No. 123131, 3 specimens, 240 to 329 mm., from Estanques Bay, U. S. S. *Niagara*, December 31, 1924.

Order OSTARIOPHYSOIDEA

Suborder CHARACINOIDEA

Family CHARACINIDAE

The characinid fishes were reported upon by me in a previous paper entitled "The Fishes of the Family Characinidae from Venezuela, with Descriptions of Seventeen New Forms," published in the Proceedings of the United States National Museum, volume 95, pp. 235–367, figs. 30–56, September 6, 1944. That study was based on the specimens that I collected in Venezuela during 1942 as well as on other specimens in the United States National Museum collections and on the literature. In that report were recorded from Venezuela 58 genera and 117 species and subspecies, and 29 of these species were from the Maracaibo Basin.

I take this opportunity to correct some of the more important errors that have been observed in my report on this group of fishes.

On page 258 I introduced the new subfamily name Ctenolucinae, but Dr. C. L. Hubbs has called to my attention that in Copeia, 1939, No. 3, p. 168, he had introduced the subfamily name Hepsetinae for a related characinid occurring in Africa. It is by no means certain that the African group is as closely related as the external features seem to indicate, but pending further investigations I shall recognize the subfamily Hepsetinae.

In table 7, p. 263, for *asper* the number of scales above lateral line should be one count each for 7 and 8 instead of 11 under 7 as given.

On page 264, last two lines of large type 7 or 8 should be transposed with 8 or 9.

I overlooked three species described as new by Valenciennes *in* Cuvier and Valenciennes, Histoire Naturelle de Poissons, volume 19, 1846, until it was too late to enter them in my report. The following should be referred to the synonymy of *Hoplias malabaricus* (Bloch): *Macrodon tareira*, p. 508, from Lago de Maracaibo; *Macrodon teres*, p. 521, from Lago de Maracaibo; and *Macrodon guavina*, p. 527, from Laguna de Tacarigua, Valley of the Río Aragua.

Enrico Tortonese (1942, p. 75, pl. 2, fig. 3) reports *Hemibrycon dariensis* Meek and Hildebrand from Río del Paso Real, Puerto Cabello, Venezuela. Since his description and figure agree fairly well with specimens from the Río Tuy and Río Guárico systems, I refer the identification made by Tortonese to *Hemibrycon dentatus metae* Myers, keyed out in my characinid paper on p. 363.

Suborder GYMNOTOIDEA: Peces Cuchillo

Body elongate, usually compressed, eellike; with or without scales; head naked; dorsal fin lacking or represented by a fleshy filament mostly attached along back posteriorly; pelvics absent; anal fin very long; pectoral fins short, rounded; caudal fin absent or very small, the tail tapering to a point in species lacking the caudal fin; mouth with or without teeth; premaxillary and maxillaries forming upper jaws; anus always in front of middle of pectorals, usually under middle of head; shoulder girdle suspended from skull; symplectic bone present; air bladder in two parts connected by a tube; stomach with blind sac and pyloric caeca (after Ellis).

Since publishing my description of *Hypopomus beebei* in Zoologica, 1944, and placing it in the family Gymnotidae, I have concluded that it may be advantageous to break this group up into at least three families as recognized in the following key:

KEY TO THE GENERA REPORTED FROM VENEZUELA [12]

1*a*. Lower jaw not prolonged or longer than upper jaw; a large frontal and parietal fontanel along middorsal line of head; head not depressed; teeth if present villiform or minute; electric organs absent (family Sternarchidae).

2*a*. Caudal fin absent; the tail behind anal fin slender and tapering to a point; dorsal filament absent.

3*a*. Snout not tubular, but short or moderately elongate.

4*a*. Orbital margin free; both jaws with villiform teeth.

Sternopygus Müller and Troschel

4*b*. Orbital margin not free.

5*a*. A cylindrical filament in a pair of grooves on under side of head in mental region; snout short, head chubby; teeth absent.

Steatogenys Boulenger

[12] See table 7 for anal-ray counts.

TABLE 7.—*Anal-ray counts made on species of Gymnotidae*

Genus and species	142 143	144 145	146 147	148 149	150 151	152 153	154 155	176 177	178 179	180 181	182 183	184 185	186 187	188 189	190 191	192 193	194 195	196 197	198 199	200 201	202 203	204 205	238 239	240 241	242 243	244 245	246 247	248 249
Apteronotus cuchillo [1]								1	1	3	1	1	2					1										
Apteronotus leptorhynchus [1]		1		2	1	1	1	1																				
Eigenmannia virescens [1]									1	1	1	2	2		1		1		2	1		1						
Eigenmannia goajira [1]																												
Eigenmannia conirostris [2]																							2		1			
Sternopygus macrurus [3]																												
Sternopygus pejeraton [1]																												

Genus and species	250 251	252 253	254 255	256 257	258 259	260 261	262 263	264 265	266 267	268 269	270 271	272 273	274 275	276 277	278 279	280 281	282 283	284 285	286 287	288 289	290 291	292 293	294 295	296 297	298 299	300 301	302 303	304 305	306 307
Apteronotus cuchillo [1]																													
Apteronotus leptorhynchus [1]																													
Eigenmannia virescens [1]																													
Eigenmannia goajira [1]			1				1																						
Eigenmannia conirostris [2]					1																								
Sternopygus macrurus [3]	1		1		2	1	1	2			1			1	1														
Sternopygus pejeraton [1]															1	1	1		1		2			1	1		1	1	1

[1] Counts made on specimens from the Maracaibo Basin.
[2] U. S. N. M. No. 52543 from Amazon Basin with 239 rays; other counts from Eigenmann and Allen.
[3] Counts made on specimens from the Río Guárico and from the Maracaibo Basin.

5*b*. Under side of head normal, without a pair of grooves with a filament.
6*a*. Teeth present in both jaws; body compressed.
Eigenmannia Jordan and Evermann
6*b*. Teeth absent in jaws; head and body compressed to rounded; the length of head equal to or longer than greatest depth; anterior nasal opening in front of upper lip and posterior nasal opening rather close to front of eye; anal fin origin about under tips of pectoral fins; prominent pores along "lateral line" canals on head; anal papillae well developed---------**Hypopomus** Gill
3*b*. Snout tubular, produced; jaws without teeth.
Rhamphichthys Müller and Troschel
2*b*. Tail rather short, caudal fin present sometimes minute; dorsal filament present; orbital margin not free.
7*a*. Snout much produced (these genera not yet reported from Venezuela).
7*b*. Snout heavy and blunt, not produced or tubular.
8*a*. Teeth present in both jaws; gill opening extending a little over halfway down in front of pectoral fin base; posterior nostril a trifle closer to anterior nostril than to eye----------**Apteronotus** Lacepède
8*b*. Teeth present in lower jaw; upper jaw without teeth; gill opening barely extends halfway to opposite pectoral fin base; posterior nostril closer to eye than to anterior nostril.
Sternarchogiton Eigenmann and Ward
8*c*. Teeth absent in both jaws; posterior nostril not quite touching the upper front margin of eye, anterior nostril midway between eye and tip of snout----------**Adontosternarchus** Ellis
1*b*. Lower jaw projecting in front of upper jaw; frontal fontanel absent; head depressed; dorsal filament absent; teeth conical in sockets.
9*a*. Anal fin not continuous around end of slender tail; body scaled; no electric glands (family Gymnotidae)----------**Gymnotus** Linnaeus
9*b*. Anal fin continuous around end of tail; body scaleless; electric glands present (family Electrophoridae)----------**Electrophorus** Gill

Family STERNARCHIDAE

Genus STERNOPYGUS Müller and Troschel

Sternopygus Müller and Troschel, Horae ichthyologicae, pt. 2, p. 13, 1849. (Genotype, *Gymnotus macrurus* Bloch and Schneider.)

KEY TO THE SPECIES OF STERNOPYGUS

1*a*. Anal rays number more than 300; snout very blunt, upper profile distinctly convex (Amazon)----------**Sternopygus obtusirostris** Steindachner
1*b*. Anal rays fewer than 300 or the upper profile of the head concave or straight.
2*a*. A black blotch behind head just above gill opening; interorbital space equal to distance from tip of snout to halfway between rear nostril and eye; dorsal profile of head convex or nearly straight; interorbital space into head 3.4 to 4 times and into length of pectoral fin 1.2 to 1.6 times; snout to occiput 7.4 to 8.4 and postorbital length of head 9.3 to 10.5, both into length of anal fin base; midaxis of body with a pale or yellowish streak posteriorly; anal rays 250 to 279 as counted by me on specimens from Venezuela----------**Sternopygus macrurus** (Bloch and Schneider)

2*b*. No black blotch behind head; interorbital space equal to distance from snout tip to rear nostril; dorsal profile of head concave; interorbital into head 4.7 to 6.0 and into length of pectoral fin 1.6 to 2.2 times; snout to occiput 5.7 to 7.4 and postorbital length of head 7.2 to 9.3, both into length of anal fin base.

3*a*. Posteriorly along midaxis of body and on tail is a bright lemon yellowish streak, pale in alcohol; tail rounded behind anal base, tapering to a point; postorbital length of head 7.3 to 8.6 into length of anal base; snout to occiput into anal base 5.7 to 6.6; interorbital space 1.6 to 2.0 into longest pectoral fin ray; anal rays 278 to 306.

Sternopygus pejeraton, new species

3*b*. Midaxis of body plain in color and without a pale streak; tail compressed behind anal base; postorbital length of head 8.1 to 9.3 into anal fin base; snout to occiput into anal base 6.3 to 7.3; interorbital into longest pectoral fin ray 1.8 to 2.2; anal rays 256 to 292 (Panama).

Sternopygus dariensis Meek and Hildebrand

STERNOPYGUS MACRURUS (Bloch and Schneider)

Gymnonotus macrurus Bloch and Schneider, Systema ichthyologiae, p. 522, 1801 (Brazil).

Sternopygus carapus Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (San Fernando de Apure, Venezuela)—Sachs, Aus den Llanos, 1879, p. 279 (Apure).

Sternopygus macrurus Eigenmann and Allen, Fishes of western South America, p. 313, 1942 (Orinoco).

U.S.N.M. No. 121574, 11 specimens, 94 to 210 mm. in total length, from Río Guárico and tributaries between San Sebastián and San Casimiro, L. P. Schultz, G. Zuloaga, Roger Sherman, and William Phelps, Jr., May 12, 1942.

U.S.N.M. No. 121573, 2 specimens, 250 and 260 mm. in total length, from the Río San Pedro at bridge, south of Mene Grande, March 20, 1942.

U.S.N.M. No. 121577, a specimen, 378 mm., from Río San Juan at bridge, south of Mene Grande, March 20, 1942.

U.S.N.M. No. 121575, a specimen 443 mm., Río Motatán at bridge, 22 km. north of Motatán, March 17, 1942.

U.S.N.M. No. 121576, 6 specimens, 125 to 237 mm. and 1 480 mm. to end of anal (tail regenerating), Río Negro below mouth of Río Yasa, March 2, 1942.

The following measurements were made on a specimen 377 mm. in total length from the Río San Juan, collected March 20; the data are expressed in hundredths of the length to end of anal fin (which is 316 mm.): Length of anal fin base 83.8; head 16.3; snout 5.38; eye 1.04; interorbital 4.05; postorbital length of head 9.97; snout to anus 9.96; snout to anal origin 16.1; anus to anal origin 7.00; longest pectoral ray 6.42; longest anal ray 4.11; snout to occiput 9.97; greatest depth 13.1; depth of head through eyes 6.17; distance from anterior to posterior nostril 2.03; eye to posterior nostril 2.38; width of gill opening 4.68; snout to rictus 2.85; snout to end of maxillary 3.16; snout to pectoral insertion 15.7; length of tail beyond anal 19.9.

Anal rays 277 and pectoral rays iii,11–iii,12.

STERNOPYGUS PEJERATON, new species

PEJE RATÓN

PLATE 1, A

Holotype.—U.S.N.M. No. 121572, 505 mm. in total length, collected by Leonard P. Schultz in the Río Apón, about 35 km. south of Rosario, in the Maracaibo Basin, February 26, 1942.

Paratypes.—The paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela (measurements are for total length):

U.S.N.M. No. 121564, 17 specimens, 121 to 645 mm., taken with the holotype and bearing same data.

U.S.N.M. No. 121570, 14 specimens, 143 to 385 mm., Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6.

U.S.N.M. No. 121568, 3 specimens, 165 to 188 mm., Río Machango, 20 km. above bridge, south of Lagunillas, March 21.

U.S.N.M. No. 121569, 2 specimens, 195 and 228 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21.

U.S.N.M. No. 121565, 14 specimens, 117 to 442 mm. Río Motatán at bridge 22 km. north of Motatán, March 17.

U.S.N.M. No. 121566, 7 specimens, 131 to 615 mm., Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121567, 17 specimens, 163 to 430 mm., Río Socuy, 3 km. above mouth, February 24.

U.S.N.M. No. 121571, 2 specimens, 635 and 710 mm., Río Machango at bridge south of Lagunillas, March 16.

Description.—Based on the holotype and paratypes. Measurements, expressed in hundredths of the distance from snout to rear end of anal fin, first for the holotype, then for a paratype, in parentheses, are recorded below, respectively. Total length in mm. 505 (187).

Distance from tip of snout to rear end of anal fin in mm. 455 (160). Length of anal fin base 81.7 (86.3); length of head 16.5 (16.9); snout 5.28 (5.75); eye 0.92 (1.06); interorbital space 2.75 (3.81); postorbital length of head 10.0 (10.6); distance from snout to anus 10.3 (11.9); snout to anal origin 16.8 (18.1); snout to occiput 12.9 (13.5); snout to pectoral insertion 16.1 (16.9); length of longest pectoral ray 6.26 (6.88); longest anal ray 5.72 (6.56); greatest depth of body 13.1 (12.8); depth of head through eyes 5.82 (5.94); distance from anterior nostril to posterior nostril 1.87 (1.88); eye to posterior nostril 2.53 (2.56); width of gill opening 4.28 (5.38); tip of snout to rictus 3.41 (3.12); tip of snout to rear of maxillary 3.96 (3.44); length of tail beyond end of anal fin 11.2 (16.4).

The following counts were made, respectively: Anal rays 298 (282); pectoral rays iii,13–iii,14 (iii,13–iii,13). There appear to be about 20 to 25 scales between the lateral line and midline of the back.

Body compressed, tail rounded beyond end of anal fin; snout elongate; rear margin of eye in front of middle of length of head, a distance equal to the space between eye and posterior nostril; dorsal profile of head usually a little concave, sometimes nearly straight in the young; pectoral fin equal to distance from rear of eye to snout tip; margin of eye free; gill opening extending some distance above and below pectoral fin base; anal origin under rear of base of pectoral fin; anus under middle of length of head; lateral line straight, complete; scales on upper sides of body and on tail a little enlarged; interorbital space convex equal to distance from tip of snout to rear nostril; length of head much longer than greatest depth; head about 5½ to 6 times in distance to end of anal fin; tail extends beyond anal fin a distance about equal to or a little greater than length of head.

Color.—Body uniformly dark brownish everywhere; middle of sides posteriorly with a narrow pale streak, lemon yellowish in living fish; operculum with slight intensification of the pigment; all anal and all pectoral rays darkish, the interradial membranes pale.

Remarks.—This new species is most closely related to *Sternopygus dariensis* Meek and Hildebrand from Panama. It may be distinguished from it by having the pale streak along midaxis of body and tail posteriorly and by the key on page 59. From *S. macrurus* the new species differs in having the head with a concave dorsal profile, and in addition, the interorbital space is more convex and narrower in *S. pejeraton.*

Named *pejeraton*, after the common name of this fish, peje ratón, as given to me many times in the Maracaibo Basin, in reference, no doubt, to its ratlike tail.

Genus STEATOGENYS Boulenger

Steatogenys Boulenger, Trans. Zool. Soc. London, vol. 14, No. 7, p. 428, 1898. (Genotype, *Rhamphichthys* (*Brachyrhamphichthys*) *elegans* Steindachner.)

STEATOGENYS ELEGANS (Steindachner)

Rhamphichthys (*Brachyrhamphichthys*) *elegans* Steindachner, Denkschr. Akad. Wiss. Wien, vol. 42, p. 89, 1880 (mouth of Río Negro).

Tateichthys duidae La Monte, Amer. Mus. Nov. No. 373, p. 1, fig. 1, 1929 (Burned Mountain Creek, Mount Duida, Venezuela).

Genus EIGENMANNIA Jordan and Evermann

Eigenmannia Jordan and Evermann, U. S. Nat. Mus. Bull. 47, p. 341, 1896. (Genotype, *Sternopygus humboldtii* Steindachner [substitute name for *Cryptops* Eigenmann].)

KEY TO THE SPECIES OF EIGENMANNIA REPORTED FROM VENEZUELA

1*a*. Anal rays 185 to 224; rear margin of eye an eye diameter in front of middle of length of head; dorsal profile of head convex; snout shorter than interor-

bital space; a narrow black streak along lateral line; black pigment on each bony support along base of anal fin.

Eigenmannia virescens (Valenciennes)

1*b*. Anal rays 255 and 263; rear margin of eye at middle of length of head; dorsal profile straight or a trifle concave; snout much longer than interorbital space; no black streak along lateral line; no black pigment along base of anal fin----------**Eigenmannia goajira,** new species

EIGENMANNIA VIRESCENS (Valenciennes)

Sternarchus virescens VALENCIENNES, *in* d'Orbigny, Voyage dans l'Amérique Méridionale, Poissons, vol. 2, pl. 13, fig. 2, 1847 (ref. copied).—EIGENMANN AND WARD, Proc. Washington Acad. Sci., vol. 7, p. 172, fig. 14, 1905 (Río Magdalena to Río de La Plata, east of Andes).—HILDEBRAND, Field Mus. Nat. Hist., zool. ser., vol. 22, No. 4, p. 292, 1938 (Río Mamoni near Chepo, Río Tuyra to Río Magdalena to Buenos Aires).

Eigenmannia virescens humboldtii IHERING, Rev. Mus. Paulista, vol. 7, p. 283, 1907 (Venezuela, Amazona, Marajó).

Sternopygus virescens SACHS, Aus den Llanos, 1879, p. 279 (Apure).—EIGENMANN AND EIGENMANN, Proc. U. S. Nat. Mus., vol. 14, p. 16, 1891 (Orinoco).

U.S.N.M. No. 121581, 8 specimens, 120 to 165 mm., Río Apón, about 35 km. south of Rosario, February 26, 1942.

U.S.N.M. No. 121579, 4 examples, 88 to 128 mm., Río San Pedro at bridge, south of Mene Grande, March 20, 1942.

U.S.N.M. No. 121578, 11 specimens, 80 to 136 mm., Río Negro below mouth of Río Yasa, March 2, 1942.

U.S.N.M. No. 121583, 10 specimens, 73 to 165 mm. Río Socuy, 3 km. above mouth, February 24, 1942.

U.S.N.M. No. 121582, 4 specimens, 97 to 160 mm., Río San Juan near the bridge south of Mene Grande, March 17 to 20, 1942.

U.S.N.M. No. 121580, 10 specimens, 145 to 210 mm., Río Motatán at bridge, 22 km. north of Motatán, March 17, 1942.

The following number of anal rays were counted on the specimens listed above: 179; 180; 182; 184; 185; 187; 187; 190; 194; 198; 199; 201 and 205.

This species, when taken from the water, was silvery in coloration and more or less translucent.

As a result of my examination of various specimens of *Eigenmannia* centering around the species currently recognized as *virescens*, I am forced to conclude that this species should be broken up into one or more subspecies. One should especially note that in British Guiana two species are undoubtedly passing under *E. virescens*. Specimens from the Botanic Garden (U.S.N.M. No. 66296) and others have 185 to 198 anal rays. Those from Wismar (U.S.N.M. No. 66298) have 208 to 224 anal rays and the anal fin has a dark band distally more ntense anteriorly on these alcoholic specimens. I have not yet been able to work out the valid names for these two species. Undoubtedly the Panamanian form of *virescens* should be described as a new subspecies on the basis of fewer anal rays (165), a larger eye, and longer pectoral fin, but I hesitate to take this step as our only specimen is without a tail.

EIGENMANNIA GOAJIRA, new species

PLATE 1, B

Holotype.—U.S.N.M. No. 121596, 500 mm. in total length and 385 mm. from snout tip to end of anal fin base, collected by Leonard P. Schultz, February 24, 1942, in the Río Socuy, 3 km. above its mouth.

Paratype.—U.S.N.M. No. 121597, 430 mm. total length (with regenerated tail), and 347 mm. from snout tip to end of anal fin base, taken along with the holotype and bearing same data.

The types were collected over a sandy to muddy bottom.

Description.—Measurements were made on the holotype and paratype, and these data, expressed in hundredths of the distance from tip of snout to rear end of anal-fin base, are recorded in table 8.

The following counts were made, respectively, for holotype and paratype: Anal rays 263 and 255; pectoral rays ii, 18–ii, 19 and ii, 16–ii, 17.

TABLE 8.—*Measurements, expressed in hundredths of the distance from snout to end of anal-fin base, for species of* Eigenmannia

Characters	*goajira*		*conirostris* [1]	*virescens*
	Holotype	Paratype		
Total length in millimeters	500.0	430.0	405.0	207.0
Snout to end of anal fin in millimeters	385.0	347.0	275.0	152.0
Length of anal base	87.8	85.6	85.5	88.2
Length of head	12.0	13.5	12.9	14.1
Snout	4.08	5.18	3.64	4.28
Eye	1.56	1.53	2.63	2.00
Interorbital	2.47	3.05	2.07	4.74
Postorbital length of head	6.80	7.06	7.64	8.76
Distance between anterior and posterior nostrils	1.04	1.38	1.09	1.71
Distance between eye and posterior nostril	2.05	2.25	1.27	1.58
Width of gill opening	3.12	3.75	4.18	4.60
Tip of snout to rictus	1.69	2.02	3.09	2.70
Snout to anus	6.88	7.06	10.2	7.57
Snout to anal origin	14.0	14.8	14.2	15.8
Anus to anal origin	7.14	7.87	4.18	8.95
Snout to occiput	10.3	11.0	9.24	10.9
Snout to pectoral insertion	12.0	13.2	12.7	13.6
Longest pectoral ray	6.94	7.38	7.10	----------
Longest anal ray	5.02	5.19	5.10	6.12
Greatest depth of body	12.1	13.3	13.0	17.4
Depth of head through eyes	5.46	5.90	5.82	8.23
Length of tail beyond anal fin	29.6	[2] 22.2	48.4	36.9

[1] This specimen, U.S.N.M. No. 52543, was reported upon by Eigenmann and Bean (Proc. U. S. Nat. Mus., vol. 31, p. 666, 1907) as *Eigenmannia troscheli*, but I now identify it as *E. conirostris* Eigenmann and Allen.

[2] Regenerated tail.

The body is elongate, compressed, but the tail is rounded, and the length of the tail behind anal fin is contained 2.9 times in length of

anal-fin base; the dorsal profile of the head is straight or with a very slight concavity; the snout is somewhat pointed and rounded; the rear margin of the eye is at about the midlength of the head or a little in front of it; the eye is contained 2⅔ to 3⅓ in the snout and 1.5 to 1.8 in the interorbital space; the anus is under rear of eye; origin of anal fin under rear of base of pectoral fin; the gill opening extends above and below base of pectoral fin; upper and lower jaws with patches of villiform teeth; the lower jaw is a little shorter than upper, so that the snout projects a little; the mouth is small, so that the rictus or corner of mouth is just a trifle behind a vertical line through anterior nostril; tip of snout to rear of maxillary 2 in snout; distance between anterior and posterior nostrils 1.5 times in distance from eye to posterior nostril; the interorbital space is convex, and its width is equal to the distance from the tip of snout to posterior nostril; the lateral line is straight; body and tail covered with scales, head naked; the scales along sides of body largest; about 13 or 14 rows of scales between lateral line and middorsal line; the pectoral fin length is equal to the distance from center of eye to rear of head; fontanel present along middorsal line of head. Apparently both specimens are males with short anal papillae and the testes are fully developed.

Color.—Live examples of this species were silvery on sides and a little darker dorsally. In alcohol it is plain pale in color on sides and pale brownish dorsally; a dark brown streak continues on dorsal surface of tail to its tip, contrasting sharply with the whitish sides and whitish ventrally; pectoral and anal fins white; operculum with a dark blotch; peritoneum pale.

Remarks.—This new species of gymnotid eel would trace down through the "Key to the Species of Genus *Eigenmannia*" by Eigenmann and Allen (1942, p. 315) to their new species *E. conirostris* on the basis of 239 to 259 anal rays; all other species of *Eigenmannia*, such as *virescens*, *troscheli*, and *macrops*, have fewer than 225 anal rays. In addition, *macrops* has the caudal filament equal to "half the total length without the head," while in *goajira* the caudal filament is contained nearly 3 times in the anal-fin base; *virescens* has a black streak along lateral line, another along base of anal fin, both lacking in *goajira; troscheli* has a very bluntly rounded short snout contained about 3.75 to 4 in the head instead of 2.6 to 3 in the head of *goajira*. *E. conirostris* and the new species are closely related but differ in the position of the eye; in *conirostris* the rear margin of the eye is about an eye diameter closer to tip of snout than rear of head instead of equal distance as in *goajira;* in addition, *goajira* appears to have a larger number of anal rays, 255 and 263, than *conirostris* with 239 to 259.

Named *goajira* in reference to the district inhabited by the Goajira Indians, where this fish was collected.

Genus HYPOPOMUS Gill

Hypopomus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1864, p. 152. (Genotype, *Rhamphichthys mulleri* Kaup.)

After examining the material in the national collections, along with four specimens collected by Dr. William Beebe at Caripito, Venezuela, and comparing these with figures and descriptions of the already described species, I have considerable doubt as to the identifications made by Ellis in his review of the family Gymnotidae and by Eigenmann in his work on British Guiana fishes. (The two accounts are nearly identical.) The specimens from Caripito have a very bluntly rounded snout and shorter head, and the pore above the posterior nostril differs in position when compared with forms from other localities. Unfortunately, Kaup did not show the position of that pore in reference to the posterior nostril, but his measurements of and his figure of *artedi* indicate that this species has a pointed snout with the rear margin of the eye behind the middle of the length from snout to occiput, while in other forms it is equidistant between, as shown in figures and in the specimens before me. Steindachner's figure of *brevirostris* fortunately shows the position of the pores in reference to the posterior nostril, and these are the same as in the specimens that I am referring to *occidentalis* Regan from Panama and the Maracaibo Basin, but the species must be different since *brevirostris* has 259 or 260 anal rays instead of fewer than 240 in the other species. Because of the above differences it appears probable that the specimens from Caripito represent a distinct species, whereas those from the Maracaibo Basin are so close to those from Panama that I identify them as the same form. Measurements made on available specimens are recorded in table 9.

KEY TO THE SPECIES OF HYPOPOMUS

1*a*. Anal rays about 259 or 260; pore above posterior nostril (see fig. 9) lying behind a vertical line through rear edge of posterior nostril and this pore more remote from nostril than nostril is from edge of eye; tail behind anal fin rounded, tapering to a point, and length of tail contained about 4 times in total length; distance from posterior nostril to eye contained about 10 to 15 times in snout to occiput (Río Guaporé).

Hypopomus brevirostris (Steindachner)

1*b*. Anal rays fewer than 240, usually from 204 to 238.

2*a*. Rear margin of eye at least one-half to an eye diameter behind middle of length of distance from snout to occiput; snout contained 2.5 to 3 times in the head and about 1⅔ in postorbital length of head; distance from posterior nostril to eye contained about 15 times in length from snout to occiput; pore above posterior nostril lying behind a vertical line through rear edge of nostril (Río Mona, French Guiana).

Hypopomus artedi (Kaup)[13]

[13] *Rhamphichthys mulleri* Kaup is referred to this species as a synonym. I have examined a specimen of *artedi*, I. U. 12620, kindly lent by Dr. J. L. Kask, California Academy of Sciences, and refer it to this species.

2*b*. Rear margin of eye midway between tip of snout and occiput; snout contained more than 2 times in postorbital length of head.

3*a*. Distance from posterior nostril to eye contained 9 to 14 times in length from snout to occiput; pore above posterior nostril lying behind a vertical line through rear of nostril, or this line bisecting the pore, the latter separated from nasal opening by an isthmus of skin; tail behind anal compressed and ending rather abruptly not gradually tapering to a rounded point and contained about 5 to 6 times in total length; snout 2.2 to 2⅓ into postorbital length of head (Río Condoto; Panama; Maracaibo Basin)----------**Hypopomus occidentalis** Regan

3b. Distance from posterior nostril to eye contained about 25 to 32 times in distance from snout to occiput; pore above posterior nostril lying close to margin of that nostril and bisected by a line through middle of posterior nostril or the pore is just in front of this line; snout very bluntly rounded, 2.5 to 2.8 times in postorbital length of head; tail very little compressed, tapering to a point and contained about 5⅓ to 6 times in total length (Caripito, Venezuela)------**Hypopomus beebei** Schultz

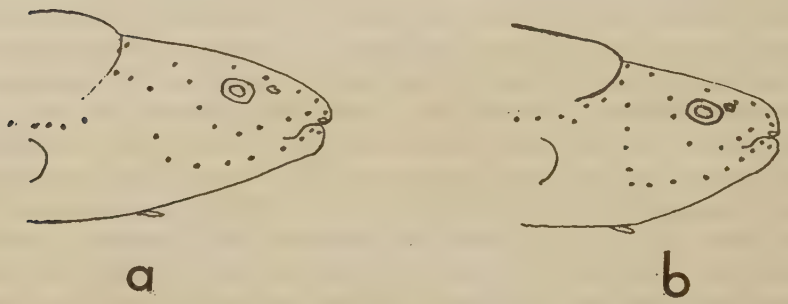

FIGURE 9.—Arrangement of cephalic pores and position of eye: *a*, *Hypopomus occidentalis* Regan; *b*, *Hypopomus beebei* Schultz. Sketches by author.

HYPOPOMUS OCCIDENTALIS Regan

FIGURE 9, *a*

Hypopomus occidentalis REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 14, p. 32, 1914 (Río Condoto, Colombia).

? *Hypopomus brevirostis* IHERING, Rev. Mus. Paulista, vol. 7, p. 281, 1907 (Venezuela).

U.S.N.M. No. 121586, 38 specimens, 63 to 167 mm., Río San Pedro at bridge, Motatán system, March 20, 1942.

U.S.N.M. No. 121584, 8 specimens, 49 to 115 mm., Río San Juan, 12 km. south of Rosario, February 26, 1942.

U.S.N.M. No. 121585, 11 specimens, 70 to 175 mm., Río San Juan at bridge south of Mene Grande, tributary of Río Motatán, March 20, 1942.

HYPOPOMUS BEEBEI Schultz

PLATE 2; FIGURE 9, *b*

Hypopomus beebei SCHULTZ, Zoologica, vol. 29, No. 1, p. 40, fig. 1, pl. 1, fig. 4, 1944 (Caripito, Venezuela).

I wish to point out an error in the figure of this species as published (Schultz, 1944g, pl. 1, fig. 4). On the head occurs a small black spot that might be mistaken for the eye but that does not occur on the fish or on the original photograph but mysteriously appeared when printed. The text figure fortunately shows the eye in its proper position as does the plate mentioned above. In the latter the eye is the whitish area near the front of the snout.

The following description is of the holotype, U.S.N.M. No. 102753, and three paratypes in the collection of the New York Zoological Society. Measurements, along with those for other species, are presented in table 9.

Body compressed, tail slightly compressed and tapering to a point; head bluntly rounded; snout short, about equal to interorbital space, contained about 4.2 times in head; jaws without teeth; length of pectoral fin 2 in head; lateral line straight, the 3 rows of scales below and about 4 rows above enlarged; scales along back and ventrally on body much smaller in size; head a trifle longer than greatest depth; origin of anal fin about opposite tips of pectorals; anal papilla present, its base under middle of opercle or a vertical line through occiput passes through base of anal papilla; lower jaw very slightly shorter than upper; mouth terminal, small; cephalic canals and pores prominent; mucus pores numerous on head; gill opening extending a little above

TABLE 9.—*Counts and measurements made on species of* Hypopomus, *expressed in hundredths of the length from snout tip to end of anal fin*

Characters	*beebei*			*occidentalis*		*artedi*	*brevirostris*
	Holotype	Paratype	Paratype	Maracaibo Basin		After Kaup	After Steindachner's figure
Length to end of anal fin in millimeters	112.0	106.0	124.0	100.0	137.0	244.0	252.0
Length of anal fin base	83.0	84.0	83.9	85.0	81.7	----------	86.5
Length of head	12.1	12.3	11.7	13.1	12.4	13.5	11.7
Length of snout	3.21	3.11	3.06	4.0	3.87	5.12	2.78
Greatest depth	11.06	11.8	9.68	12.0	13.1	9.30	9.33
Width of interorbital space	3.03	3.30	3.14	3.00	2.72	----------	----------
Postorbital length of head	8.48	8.20	8.14	8.30	8.03	7.78	7.34
Snout to occiput	8.57	8.49	8.06	10.0	9.20	9.02	7.74
Diameter of eye	1.25	1.42	1.29	1.50	1.24	0.98	1.59
Distance from anterior to posterior nostril	2.23	2.08	2.26	2.70	2.12	----------	1.90
Distance from eye to posterior nostril	0.28	0.27	0.32	0.80	0.88	----------	0.56
Width of gill opening	2.41	2.73	2.58	2.70	3.22	----------	2.85
Snout to anus	8.48	9.34	8.14	9.50	8.61	7.10	8.92
Snout to anal origin	17.4	16.6	16.1	16.2	16.8	20.7	15.5
Anus to anal origin	9.64	7.83	8.39	7.50	8.39	----------	7.54
Snout to pectoral insertion	11.2	11.3	11.3	12.5	12.1	----------	11.7
Longest ray of pectoral fin	5.35	5.47	--------	6.20	5.84	5.29	5.36
Longest ray of anal fin	4.02	--------	--------	5.00	4.60	----------	3.77
Length of tail beyond anal fin	21.0	22.3	20.1	20.5	25.1	20.9	32.9
Width of head at eyes	4.46	5.19	4.92	4.30	3.87	----------	----------
Number of anal rays	214	228	217	204	223	220 or 223	259 or 260

and below pectoral fin base and more or less enclosing it, except posteriorly; margin of eye not free, eye small, a little over two times in the interorbital space; interorbital space convex, about 3 times in distance from snout tip to occiput; fontanel present from between eyes to occiput.

Color.—Body light brownish in alcohol with 17 narrow dark-brown bars across sides to end of anal fin, sometimes an incomplete or broken bar between most of or all the nearly complete bars; pectoral fins and anal fin with numerous dark brown pigment specks; tail beyond anal fin with about 3 more brown bars more or less obscure or absent.

Genus RHAMPHICHTHYS Müller and Troschel

Rhamphichthys Müller and Troschel, Horae ichthyologicae, pt. 2, p. 15, 1849. (Genotype, *Gymnotus rostratus* Linnaeus.)

RHAMPHICHTHYS ROSTRATUS (Linnaeus)

Gymnotus rostratus Linnaeus, Systema naturae, ed. 12, vol. 1, p. 428, 1766.

Rhamphichthys schomburgki Steindachner, Sitzb. Akad. Wiss. Wien, vol. 58, p. 10, 1868 (Río Negro).

Rhamphichthys pantherinus Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (San Fernando de Apure, Venezuela).—Sachs, Aus den Llanos, 1879, p. 279 (Apure).

Rhamphichthys marmoratus Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 62, 1891 (Orinoco).—Eigenmann and Ward, Proc. Washington Acad. Sci., vol. 7, p. 168, fig. 12, 1905 (Orinoco and Guianas south to Río de la Plata).

Rhamphichthys rostratus marmoratus Ihering, Rev. Mus. Paulista, vol. 7, p. 280, 1907 (Venezuela).

Genus APTERONOTUS Lacepède

Apteronotus Lacepède, Histoire naturelle des poissons, vol. 2, p. 208, 1800. (Genotype, *Apteronotus passau* Lacepède=*Gymnotus albifrons* Linnaeus.)

Sternarchus Bloch and Schneider, Systema ichthyologicae, p. 497, 1801. (Genotype, *Gymnotus albifrons* Linnaeus.)

KEY TO THE SPECIES REPORTED FROM VENEZUELA

1*a*. Dorsal profile of head rounded or convex, the snout blunt; interorbital space 3.25 to 3.5 in the head; rear margin of eye at middle of head length; snout about two-thirds length of pectoral fin and about 3 times in greatest depth; depth of head at occiput 1⅓ in its length; a white band from tip of snout along middorsal line to top of head; two white bands encircle body, the first at rear of anal fin and the second smaller at origin of caudal fin; anal rays 155 to 170.....**Apteronotus albifrons** (Linnaeus)

1*b*. Dorsal profile of head concave or straight in young, snout elongate, not blunt; interorbital space 6 to 9 times in the head and 2 to 2.5 in the snout.

2*a*. Anal fin hyaline or pale; snout elongate, equal to pectoral fin and about 2 times in greatest depth; depth of head at occiput 1.8 to 2 in its length; rear of eye about at middle of length of head; a white band from snout tip along middorsal line to and including dorsal filament; tip of chin white; posterior end of caudal peduncle encircled with white; anal rays 142 to 158.....**Apteronotus leptorhynchus** (Eigenmann)

2*b*. Anal fin rays blackish except posteriorly, which may be white; snout elongate, equal to three-fourths to four-fifths length of pectorals and about 3 times in greatest depth; depth of head at occiput 1⅔ in its length; rear of eye in front of middle of head by more than the distance between the anterior and posterior nostrils or the width of interorbital space; a more or less interrupted white band from snout tip to top of head; a broad band encircling body and anal fin near rear of latter on specimens shorter than 200 mm. total length and on those larger this white band becoming mottled and broken up with black blotches, while in specimens 300 mm. or longer only a trace remaining as a white blotch or so on the anal fin, or it may be lacking; anal rays 176 to 197.

Apteronotus cuchillo, new species

APTERONOTUS ALBIFRONS (Linnaeus)

Cuchillo

Gymnotus albifrons Linnaeus, Systema naturae, ed. 12, vol. 1, p. 428, 1766 (ref. copied).

Sternarchus albifrons Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (Río Apure, Venezuela).—Sachs, Aus den Llanos, 1879, p. 279 (Apure).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 61, 1891 (Apure).—Eigenmann and Ward, Proc. Washington Acad. Sci., vol. 7, p. 163, fig. 2, 1905 (Orinoco).—Ihering, Rev. Mus. Paulista, vol. 7, p. 273, 1907 (Guianas, Venezuela, Ecuador, Río Amazon to Peru and Río Paraguay).

Apteronotus albifrons Eigenmann and Allen, Fishes of western South America, p. 321, 1942 (Orinoco).

APTERONOTUS LEPTORHYNCHUS[14] (Eigenmann)

Sternarchus leptorhynchus Eigenmann, Mem. Carnegie Mus., vol. 5, p. 439, 1912 (Amatuk; Warraputa).

U.S.N.M. No. 121595, 10 specimens, 103 to 178 mm. in total length, Río San Juan near bridge south of Mene Grande, tributary of Río Motatán, March 17 and 20, 1942.

U.S.N.M. No. 121593, 3 specimens, 94 to 151 mm., Río San Pedro at bridge south of Mene Grande, Motatán system, March 20, 1942.

U.S.N.M. No. 121594, a specimen, 43 mm., Río Negro below mouth of Río Yasa, March 2, 1942.

U.S.N.M. No. 121592, a specimen, 57.5 mm., Río San Juan, 12 km. south of Rosario, February 26, 1942.

APTERONOTUS CUCHILLO, new species

Plate 3, A

Pez Cuchillo

Holotype.—U.S.N.M. No. 121591, 363 mm. in total length, 350 mm. to base of caudal fin and 330 mm. to end of anal fin, collected by Leonard P. Schultz in the Río Socuy, 3 km. above mouth, February 24, 1942.

Paratypes.—All paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

[14] This species has been reported from the Orinoco Basin at Guaicaramo, Colombia, and from the Ríos Calima, Saija, and Dagua, western Colombia.

U.S.N.M. No. 121587, 13 specimens, 156 to 385 mm. in total length, collected with the holotype and bearing same data.

U.S.N.M. No. 121589, 11 specimens, 164 to 390 mm., Río Motatán at bridge, 22 km. north of Motatán, March 17.

U.S.N.M. No. 121588, 3 specimens, 215 to 375 mm., Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6.

U.S.N.M. No. 121590, 7 specimens, 132 to 194 mm., Río Apón about 35 km. south of Rosario, February 26.

Description.—The following description was based on the holotype and paratypes. Detailed measurements were made on the former and two of the latter, and these data are expressed in hundredths of the length to end of anal fin and recorded respectively for the holotype and the paratypes in parentheses.

Total lengths 363 (221; 131.5); length to base of caudal fin 350 (213; 128.5); length from tip of snout to end of anal fin 330 (202; 121). Greatest depth of body 15.8 (15.8; 16.8); length of head 16.4 (17.1; 18.4); length of snout 5.60 (5.79; 6.28); least width of interorbital space 1.82 (2.38; 2.89); diameter of eye 0.76 (0.89; 1.16); distance between anterior and posterior nasal openings 1.67 (1.68; 1.98); distance from eye to posterior nasal opening 2.58 (2.23; 2.07); postorbital length of head 11.8 (11.7; 11.6); length from tip of snout to rictus 3.82 (3.57; 5.12); width of gill opening 2.49 (2.72; 2.89); least depth of caudal peduncle 1.36 (1.24; 1.65); length of caudal peduncle from end of anal fin to midcaudal base 6.58 (5.60; 5.95); snout to occiput 13.8 (13.6; 15.7); snout to anus 8.33 (8.62; 11.7); snout to pectoral insertion 16.7 (16.7; 18.8); snout to anal origin 15.3 (14.8; 11.7); snout to anterior end of groove between dorsal filament and back or rear base of dorsal filament 66.7 (69.0; 65.7); length of longest pectoral fin ray 7.88 (8.90; 8.85); longest anal ray 5.91 (6.68; 7.19); longest caudal fin ray 3.24 (3.46; 3.47).

The following counts were made, respectively: Anal rays 187 (197; 181); pectoral rays ii,16-ii,16 (ii,15-ii,16; ii,16-ii,16); number of pores to end of lateral line 100 (101; 96); 3 scales between base of dorsal filament and lateral line.

Body compressed, caudal region compressed; caudal fin about three-fourths length of snout; caudal peduncle about one-half length of head; pectoral fin length a little over one-half length of head; snout elongate, somewhat pointed, the dorsal profile of head a little concave or straight; greatest depth of body a little behind tips of pectorals; lower edge of gill opening opposite middle of pectoral base or a little below the middle; eye small without a free membrane and contained from 6 to 11 times in the snout; rictus under posterior nostril; anterior nostril tubular; posterior nostril a little closer to eye than tip of snout; anus under a vertical about 2 diameters behind rear of eye; rear edge of base of dorsal filament about equal distance between tip of caudal fin and rear of head or base of pectoral fin;

at about half the distance from tip of snout to base of dorsal filament there are 13 or 14 scales between lateral line and middorsal line; the third or fourth branched rays of pectorals longest; anal rays near middle of that fin longest; lateral line straight, complete, the scales along lateral line and midsides largest, gradually becoming smaller dorsally and ventrally; caudal fin minutely scaled for three-fourths the way out, the last third naked; interorbital sharply convex, about equal to distance between anterior and posterior nostrils and about 3⅓ in the head; origin of anal under gill opening; tip of lower jaw with a groove separated by a frenum at each side of tip from groove along sides of lower jaw; mouth terminal, lower jaw fitting up between the maxillaries; a small patch of villiform teeth on each side near front of upper jaw; two rows of a few conical teeth at sides of lower jaw; apparently no teeth near symphysis of lower jaw; a long fontanel along middorsal line of head.

Color.—In alcohol the ground color is mottled dark brown or blackish at all ages, but the white color markings are greatly variable with increase in length. A specimen 132 mm. in total length has a cream-white band that encircles the body in the last one-fourth of the anal fin, but the white color does not quite reach to end of anal as the last few rays are blackish; the caudal peduncle is blackish except posteriorly where a second narrow white band encircles it just in front of base of caudal fin; caudal fin and anal fin blackish except posteriorly; tip of chin pale or white; a white band from snout tip along middorsal line to top of head thence represented by a few pale blotches for a short distance along the back; pectorals blackish.

A specimen 250 mm. in total length has the white streak along top of head ending at occiput, and the wide white band near rear of anal is broken up by numerous dark brown blotches, but there is no dark blotch on the anal fin; otherwise coloration as in the specimen 132 mm. long.

In the holotype, 363 mm. long, the pale band at rear of anal is almost lacking, as the sides of the body in that region are blackish, along the midline of back are a few white blotches and part of anal fin is still white; the white band just in front of caudal fin is reduced in width. In the largest specimens the white band at rear of anal may be completely lacking but the narrow white streak at base of caudal fin does not completely disappear.

The peritoneum is pale.

Remarks.—This new species is close to *leptorhynchus* in shape of head and snout but differs from it in having the eye considerably in front of middle of length of head and also in several other respects, as indicated in the key on page 68. In coloration this new species differs from all others referred to the genus *Apteronotus* except *A.*

albifrons, which has the two white bands encircling the body; it differs in its elongate snout, blunt and rounded in *albifrons*, as indicated in the key. *Apteronotus anas* Eigenmann and Allen has the eye far back, considerably behind middle of length of head.

Named *cuchillo*, the common name of this type of fish in Venezuela, probably referring to its knifelike shape.

Genus STERNARCHOGITON Eigenmann and Ward

Sternarchogiton Eigenmann and Ward, Proc. Washington Acad. Sci., vol. 7, p. 164, fig. 5, 1905. (Genotype, *Sternarchogiton nattereri* (Steindachner) = *Sternarchus nattereri* Steindachner.)

STERNARCHOGITON CUCHILLEJO, new species

Pez Cuchillejo

Plate 3, B

Holotype.—U.S.N.M. No. 121600, 168 mm. in total length, and 156 mm. to end of anal base, collected by Leonard P. Schultz in Río Motatán, 8 km. below Motatán, March 24, 1942.

Paratypes.—All the paratypes were collected by Leonard P. Schultz during 1942 in the Maracaibo Basin of Venezuela:

U.S.N.M. No. 121601, 5 specimens, 148 to 177 mm., taken along with the holotype and bearing same data.

U.S.N.M. No. 121599, 47 specimens, 92 to 189 mm., Río Motatán at bridge, 22 km. north of Motatán, March 17.

U.S.N.M. No. 121602, 10 examples, 80 to 115 mm., Río San Pedro at bridge, Motatán system, March 20.

U.S.N.M. No. 121598, 7 specimens, 61 to 148 mm., Río Negro below mouth of Río Yasa, March 2.

U.S.N.M. No. 121603, 2 specimens, 120 to 156 mm., Río Machango, 20 km. above bridge south of Mene Grande, March 21.

Description.—The description is based on the holotype and paratypes listed. Detailed measurements were made on the holotype and one paratype, and these data are recorded below in hundredths of the distance from the tip of the snout to end of anal fin, respectively. Total length 168 (112); length to base of caudal fin 156 (106); and length of snout tip to end of anal fin 130 (89.5).

Greatest depth 15.0 (16.8); least depth of caudal peduncle 1.38 (1.34); length of caudal peduncle from end of anal fin to midcaudal fin base 19.6 (22.3); length of head 14.4 (15.3); snout 4.62 (5.25); interorbital 4.00 (4.69); eye 2.00 (1.79); distance between anterior and posterior nostrils 1.85 (2.13); postorbital length of head 9.39 (9.50); least width of preorbital space 2.92 (3.13); tip of upper lip to occiput 11.3 (12.0); length from tip of upper lip to rear edge of maxillaries or rictus 5.15 (6.14); width of gill opening 2.54 (2.13); tip of snout to anus 8.85 (10.6); snout to pectoral insertion 15.8 (16.7);

snout to anal origin 13.5 (14.6); snout to anterior edge of groove between dorsal filament and back 63.8 (64.5); length of longest pectoral ray 9.23 (9.28); length of longest anal fin ray 7.69 (6.93); length of longest caudal fin ray 6.70 (6.37).

The following counts were made: Anal rays 146 (139); pectoral rays ii, 12–ii, 11 (ii, 12–——); pores from rear of head to opposite end of anal fin 60 (64).

Body compressed throughout its length, the greatest depth 5.25 to 6⅓ in length to end of anal fin and 6.5 to 7.75 in total length; head 6 to 7.25 in length to end of anal and 8 to 9 in total length; eye small, about 3 to 3.5 in snout and about equal to distance between anterior and posterior nasal openings, the anterior pair tubular; eye considerably in front of middle of length of head; gape of mouth large, rictus under eye; mouth terminal; upper jaw toothless; lower jaw with two rows of short conical teeth at sides, the symphyseal region toothless; lower jaw fitting between the upper but the maxillaries fit into a groove of the lower lip at sides of lower jaw; lower lip broad, fleshy, and free from lower jaw anteriorly, without a frenum; gill opening extending down in front of middle of pectoral fin base; the third or fourth branched pectoral rays longest; rear of base of dorsal filament or the most anterior extent of groove between filament and back is an equal distance between base of caudal fin and postorbital length of head; origin of anal fin behind the middle of the opercle; interorbital space greatly convex, 3.5 to 3.75 in the head; dorsal profile convex; pectoral fin about 1⅔ in the head; body covered with scales; caudel fin scaled nearly to tips of rays; midline of back naked, with a row of scales up to caudal peduncle; scales largest along midsides and on lateral line, smaller toward back; posteriorly on caudal region the scales along lateral line are much longer than high and the pores in lateral line number from 56 to 64; 3 scales from rear base of dorsal filament to lateral line; lateral line straight, much closer to back than ventral side of body and on caudal peduncle the lateral line is dorsal in position; caudal fin present, middle rays longest; head with an elongate fontanel along middorsal line; gill rakers short, few, 1 or 2 + 3 or 4.

Color.—In alcohol, ground color dark brown, fins hyaline, except caudal which is dark brown, with its tip white; a prominent white streak extends from tip of snout along middorsal line to base of dorsal filament, thence dorsal filament is pale; chin with white blotch; body and especially head profusely covered with mucus pores, which are white; posterior end of caudal peduncle encircled with white; peritoneum pale along midventral line, but pigmented on sides.

Remarks.—This new species may be distinguished from all other species referred to the genus *Sternarchogiton* by its fewer number of

anal rays, 137 to 146, instead of more than 190 as well as in its coloration. In addition, there are two irregular rows of teeth on each side of the lower jaw instead of a single row in the other species. This tooth character may be of significance generically. The following key may be used to identify the species referred to *Sternarchogiton:*

1*a*. Anal rays about 197 or 200; sides of lower jaw with a single row of teeth; no pale streak along middorsal line.

2*a*. Head about 12 in length; eye about 3½ in the head.
S. nattereri (Steindachner)

2*b*. Head about 9 in length, eye 7 in snout; posterior half of pectoral rays dark and distal part of anal rays blackish. **S. porcinum** Eigenmann and Allen

1*b*. Anal rays 137 to 146; 2 rows of short conical teeth on sides of lower jaw; middorsal line of back with pale streak anteriorly; pale blotch on chin; head 8 to 9 in total length; eye 3 to 3½ in snout; fins all pale in color.
S. cuchillejo, new species

Some of the females have pale amber-colored eggs in their ovaries and appear to be nearly ready to spawn.

Named *cuchillejo* for the popular name of this small knife-shaped fish.

Genus ADONTOSTERNARCHUS Ellis

Adontosternarchus Ellis, Mem. Carnegie Mus., vol. 6, No. 3, p. 155, 1913. (Genotype, *Sternarchus sachsi* Peters.)

ADONTOSTERNARCHUS SACHSI (Peters)

Pez Cuchillo de las Llanos

Sternarchus sachsi Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (San Fernando de Apure, Venezuela).—Sachs, Aus den Llanos, 1879, pp. 153, 367, fig. on p. 279 (Apure).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 62, 1891 (Apure).—Eigenmann and Allen, Fishes of western South America, p. 326, 1942 (Orinoco)—Röhl, Fauna descriptiva de Venezuela, p. 377, fig. 189, 1942 (Orinoco).

Sternarchogiton sachsi Eigenmann and Ward, Proc. Washington Acad. Sci., vol. 7, p. 165, 1905 (Orinoco).

Family GYMNOTIDAE

Genus GYMNOTUS Linnaeus

Gymnotus Linnaeus, Systema naturae, ed. 10, p. 246, 1758; ed. 12, vol. 1, p. 427, 1766. (Genotype, *Gymnotus carapo* Linnaeus.)

GYMNOTUS CARAPO Linnaeus

Gimnoto

Gymnotus carapo Linnaeus, Systema naturae, ed. 10, p. 246, 1758.—Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 12, 1920 (Maracay, Río Bue, Venezuela).

Carapus fasciatus Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Apure River, Venezuela).

Family ELECTROPHORIDAE

Genus ELECTROPHORUS Gill

Electric Eel

Electrophorus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1864, p. 151. (Genotype, *Gymnotus electricus* Linnaeus.)

ELECTROPHORUS ELECTRICUS (Linnaeus)

Anguila eléctrica o temblador

Gymnotus electricus Linnaeus, Systema naturae, ed. 12, vol. 1, p. 427, 1766.—Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (Calabozo, Venezuela).—Sachs, Aus den Llanos, 1879, p. 153, figs. on pp. 149, 154 (Apure).

Electrophorus electricus Eigenmann and Allen, Fishes of western South America, p. 330, 1942 (Venezuela).—Röhl, Fauna descriptiva de Venezuela, p. 379, fig. 191, 1942 (Orinoco).

Suborder Cyprinoidea

Family CYPRINIDAE

Genus CYPRINUS Linnaeus

Minnows

Cyprinus Linnaeus, Systema naturae, ed. 10, p. 320, 1758. (Genotype, *Cyprinus carpio* Linnaeus.)

CYPRINUS CARPIO Linnaeus

Carp; Carpa

Cyprinus carpio Linnaeus, Systema naturae, ed. 10, p. 320, 1758.

This species has been introduced into Venezuelan waters and on April 3, 1942, I observed several in a small pond at Estanques, Mérida.

Suborder Nematognathoidea: Catfishes; Bagres

My first report on the collections of fishes that I made during 1942 in Venezuela covered this group. The publication is entitled "The Catfishes of Venezuela, with Descriptions of Thirty-eight New Forms," and it appeared in the Proceedings of the United States National Museum, volume 94, pp. 173–338, figs. 1–5, pls. 1–14, February 11, 1944. This report contains an itinerary of my travels and a map showing the localities where specimens were collected, along with a list of collecting stations. For all of Venezuela 127 species and subspecies in 63 genera and 12 families are listed.

Since the publication of this report two papers have appeared under my authorship on the catfishes of Venezuela: "Two New Species of Fishes (Gymnotidae, Loricariidae) from Caripito, Venezuela," Zoologica, New York, vol. 29, pt. 1, pp. 39–44, fig. 1, 2, pl. 1, May 10,

1944, and "*Pygidium monodolfi*, A New Catfish from Venezuela," Journ. Washington Acad. Sci., vol. 35, No. 1, pp. 29–31, fig. 1, January 15, 1945 (near Caracas). In addition I have published two other recent papers on catfishes from Colombia: "A New Loricariid Catfish from the Río Truando, Colombia," Copeia, 1944 No. 3, pp. 155–156, September 30, and "A New Genus and Species of Pimelodid Catfish from Colombia," Journ. Washington Acad. Sci., vol. 34, No. 3, pp. 93–95, fig. 1, March 15, 1944.

A few errors in my report on the catfishes of Venezuela have been observed, and I take this opportunity to correct some of the more important ones. On page 182, 11a should read *without*, and on the next page 3*b*, next to last line should read 6 + 11 or 12 instead of 6 + 17. The tenth line, third paragraph p. 335, should read 47.6, not 4.76.

Addenda to my report on the catfishes of Venezuela, 1944:

1. *Hexanemathichthys rugispinis* (Cuvier and Valenciennes). 1 specimen 275 mm., from mouth of Río San Juan, near Caripito, April 11, 1942. William Beebe.

2. *Selenaspis herzbergii* (Bloch). 1 specimen for each—C.N.H.M. Nos. 41990 and 41989, from Lago de Maracaibo, W. H. Osgood, 1911.

3. *Pimelodus clarias coprophagus* Schultz. 1 specimen each, C.N.H.M. Nos. 41988, 42011, 42013, 42014, 42015, from Encontrados, W. H. Osgood, 1911.

4. *Pseudopimelodus villosus butcheri* Schultz. Gomes, Occ. Pap. Mus. Zool. Univ. Michigan, No. 494, p. 4, 1946 (Río San Juan, near Mene Grande, Venezuela).

5. *Microglanis poecilus* Eigenmann. Gomes, Occ. Pap. Mus. Zool. Univ. Michigan, No. 494, p. 15, 1946 (Caño de Quiribana, Río Apure into Río Orinoco, Venezuela).

6. *Microglanis iheringi* Gomes, Occ. Pap. Mus. Zool. Univ. Michigan, No. 494, p. 9, pl. 1, 1946 (Río Turmero near Turmero, Aragua; Carabobo, Venezuela).

7. *Perrunichthys*. Recently a skin and head of a species in this genus was found in the National collections collected by Prof. Orton probably at the junction of the Napo and Marañón Rivers of the upper Amazon. This head with skin definitely represents a species distinct from *P. perruno* Schultz of the Maracaibo Basin, but a better specimen should be obtained before describing and naming it.

8. *Dupouyichthys sapito* Schultz. Cecil Miles, of Colombia, wrote to me on July 2, 1945, that a man collecting for him in the Magdalena system just brought a specimen of this species with 6 or 7 almost fully developed eggs adhering to the pelvic fins and the preanal region. Mr. Miles is to be highly complimented on the discovery of this remarkable habit of incubation of eggs for the genus, although such a type of egg incubation is known for certain Asiatic catfishes. He published on this in Caldasia, vol. 3, No. 15, p. 454, 1945.

9. *Pygidium conradi* Eigenmann. 9 specimens, 20 to 33 mm., from Guachaco Cave, Río Caripe near Caripito, William Beebe, 1942.

10. *Ochmacanthus flabelliferus* Eigenmann. 1 specimen, 37 mm., East Caripito Creek, William Beebe, March 6, 1942.

11. *Callichthys callichthys* (Linnaeus). 2 specimens, 100 and 125 mm., from Caripito, William Beebe, May 7, 1942.

12. *Hoplosternum thoracatum thoracatum* (Cuvier and Valenciennes). 2 specimens, 67 and 77 mm., Río Pablo, Caripito, William Beebe, March 19, 1942.

13. *Hoplosternum littorale* (Hancock). 1 specimen, 117 mm., Río San Pablo, Caripito, William Beebe, March 19, 1942.

14. *Ancistrus brevifilis brevifilis* Eigenmann. 1 specimen, C.N.H.M. No. 35341, Río Turmero, Venezuela, Ventura Barnés, September 24, 1937.

15. *Ancistrus brevifilis bodenhameri* Schultz. 3 specimens, C.N.H.M. Nos. 41999 to 42001, Río Coguollo, Sierra Perijá, Venezuela, Osgood and Conover, March 1920.

16. *Hypostomus watwata* Hancock. 1 specimen each, C.N.H.M. Nos. 41995 and 41996, from Lago de Maracaibo, W. H. Osgood, 1911.

17. *Loricaria typus* (Bleeker). 1 specimen, 255 mm., from Caripito, Venezuela, William Beebe, 1942.

18. *Loricaria caracasensis* (Bleeker). Described by Bleeker in his "Systema Silurorum Revisum," Nederl Tijdschr. Dierk., vol. 1, p. 81, 1863, as *Hemiloricaria caracasensis* Bleeker, from Caracas. It is the genotype of *Hemiloricaria*, a monotypic genus.

Bleeker described this species as follows: "Velum labiale vix fimbriatum postice latum, antice angustum. Dentes utraque maxilla conspicui. Cristae occipitales vel nuchales dentatae nullae. Scuta trunco carina dentata. Regio subthoracicoanalis scutata. Pinna dorsalis supra ventrales incipiens.

"Spec. typ. *Hemiloricaria caracasensis* Blkr. sp. nov in Mus. L. B. sub. nom. Loricariae. . . . . (Caracas) Conserv."

Not having any specimens from the Río Guaire at Caracas, I am unable to determine the species from Bleeker's description.

19. *Loricaria eigenmanni* Pellegrin, Bull. Soc. Zool. France, vol. 33, p. 125, 1908 (Sarare, Venezuela). This species was omitted.

20. *Forlowella acus* (Kner). 3 specimens 94 to 134 mm., from Río Pablo, Caripito, William Beebe, March 19, 1942.

21. *Spathuloricaria* may represent the adult male of some species of *Loricaria*.

22. *Chaetostoma dupouii* Yepes (Mem. Soc. Cien. Nat. La Salle, Caracas, año 5, No. 14, pp. 27–34, figs. 1945) (Río Encanthado into Río Grande of Río Tuy system, Venezuela.)

Order APODOIDEA

Family MURAENIDAE: Morays

Genus GYMNOTHORAX Bloch

Gymnothorax Bloch, Naturgeschichte der ausländischen Fische, vol. 9, p. 83, 1794. (Genotype, *Gymnothorax reticularis* Bloch as restricted by Bleeker, Nederl. Tijdschr. Dierk., vol. 2, p. 121 (9), 1865 = *G. ruppelli* McClelland.)

The following species recorded from Venezuelan waters may be traced down by the following key extracted from that in Meek and Hildebrand's "The Marine Fishes of Panama," vol. 1, pp. 162–163, 1923.

1*a*. Teeth all entire, without serrations.

2*a*. Body mottled with dark brown or slightly purplish spots; lower jaw with about 22 teeth on side; tail longer than rest of body by about two-thirds length of head ..... **Gymnothorax vicinus** (Castelnau)

2*b*. Body everywhere mottled or reticulated with pale or light yellow, varying among individuals; tail a little longer than head and trunk; snout short, about 6 in head ..... **Gymnothorax moringa** Cuvier

1*b*. Teeth serrate, at least at base of posterior margin; body with irregular light yellowish spots, variable in size and number, often making the ground color appear as brown reticulations; dorsal fin with large black spots, sometimes running together and forming a black band; anal with a dark edge.

Gymnothorax ocellatus Agassiz

GYMNOTHORAX VICINUS (Castelnau)

Murenophis vicina CASTELNAU, Animaux nouveaux ou rares recueillis dans les parties centrales de l'Amérique du Sud, vol. 2, pt. 7, Zool., Poissons, p. 81, pl. 42, fig. 4, 1855 (Bahia).

Gymnothorax vicinus TORTONESE, Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 47, No. 89, p. 51, 1939 (Puerto Cabello, Venezuela).

GYMNOTHORAX MORINGA Cuvier

MORENA

Gymnothorax moringa CUVIER, Le règne animal, ed. 2, vol. 2, p. 352, 1829 (Bahamas) (ref. copied).—RÖHL, Fauna descriptiva de Venezuela, p. 375, fig. 187, 1942 (coast of Venezuela).

Muraena (*Gymnothorax*) *moringa* METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 18, 1919 (Venezuela).

GYMNOTHORAX OCELLATUS Agassiz

Gymnothorax ocellatus AGASSIZ, *in* Spix and Agassiz, Selecta genera et species piscium . . . Brasiliam . . . , p. 91, pl. 50b, 1831 (mouth of large Brazilian equatorial rivers).

Muraena (*Priodonophis*) *ocellata* METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 19, 1919 (Venezuela)

Family ECHELIDAE: Worm Eels

Genus MYROPHIS Lütken

Myrophis LÜTKEN, Vid. Medd. Nat. For. Kjøbenhavn, 1851, p. 1. (Genotype, *Myrophis punctatus* Lütken.) (Ref. copied).

An excellent key to the species of the genus *Myrophis* occurring in the Atlantic is given by Dr. A. E. Parr in the Bulletin of the Bingham Oceanographic Collection, vol. 3, No. 4, p. 9, 1930.

MYROPHIS PUNCTATUS Lütken

Myrophis punctatus LÜTKEN, Vid. Medd. Nat. For. Kjøbenhavn, 1851, p. 1 (West Indies) (Ref. copied).

U.S.N.M. No. 123169, 1 specimen, 197 mm. in total length, from Cape San Román, April 2, 1925.

Order SYNBRANCHIOIDEA

Family SYNBRANCHIDAE

Genus SYNBRANCHUS Bloch

Synbranchus BLOCH, Naturgeschichte der ausländischen Fische, vol. 9, p. 86, 1795. (Genotype, *Synbranchus marmorata* Bloch.)

SYNBRANCHUS MARMORATUS Bloch

Synbranchus marmoratus BLOCH, Naturgeschichte ausländischen Fische, vol. 9, p. 86, 1795.—ERNST, Estudios sobre la flora y fauna de Venezuela, p. 282, 1877 (creeks near Caracas).

Symbranchus marmoratus Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 473 (Calabozo, Venezuela).—Eigenmann, Indiana Univ. Studies, vol. 7, No. 44, p. 13, 1920 (Isla del Buro; rocks on shores of Lake Valencia and mud at depth of 15 meters; Río Guaire, near Caracas, and at Caracas; Maracay; all in Venezuela).—Pearse, Univ. Wisconsin Studies, No. 1, p. 23, 1920 (Isla del Buro, Lago de Valencia, Venezuela).

4 specimens, 82 to 104 mm., near Caripito, William Beebe, May 6, 1942.
3 specimens, 88 to 108 mm., near Caripito, William Beebe, April 11, 1942.

Order SYNENTOGNATHOIDEA

Family BELONIDAE: Needlefishes; Peces agujas, o Agujones

KEY TO THE NEEDLEFISHES REPORTED FROM VENEZUELA

1*a*. Postorbital length of head about equal to base of anal fin, much longer than base of dorsal fin, and contained about 2.5 times in distance from insertion of pectoral fins to that of pelvic fins; longest pelvic fin ray about 1.5 times in longest pectoral fin ray; caudal fin not forked but deeply concave, lower lobe a little longer than upper; side of body with a blackish streak; postorbital length of head about 1.9 in snout, 1.1 in anal fin base, and 0.8 in dorsal fin base; dorsal origin notably behind anal origin.

Potamorrhaphis guianensis (Schomburgk)

1*b*. Postorbital length of head much shorter than length of anal fin base, about equal to or much shorter than base of dorsal fin and contained more than 3 times in distance from insertion of pectoral fins to that of pelvic fins.

2*a*. Longest pelvic fin ray nearly equal to longest pectoral fin ray; caudal fin forked, lower lobe longest, pointed; dorsal origin nearly over anal origin; postorbital length of head contained about 2.5 in snout, 2.2 in anal fin base and 2.5 in that of dorsal fin; side of body without dark lengthwise streak----------**Strongylura raphidoma** (Ranzani)

2*b*. Longest pelvic fin ray about 2 or more than 2 times in longest pectoral fin ray; caudal fin not forked but posterior margin concave, lobes rounded; dorsal origin notably behind anal fin origin; postorbital length of head contained from 2.75 to 3 in snout, 1.6 in anal fin base, and 1.4 in dorsal fin base; side of body with a black streak running lengthwise.

Strongylura timucu (Walbaum)

Genus POTAMORRHAPHIS Günther

Potamorrhaphis Gunther, Catalogue of the fishes in the British Museum, vol. 6, p. 256, 1866. (Genotype, *Belone taeniata* Günther.)

POTAMORRHAPHIS GUIANENSIS (Schomburgk)

Belone guianensis Schomburgk, The natural history of the fishes of [British] Guiana, vol. 2, p. 131, pl. 1, 1843 (Guiana; Paduiri) (ref. copied).

One specimen, 225 mm., Río Apure at San Fernando de Apure, F. F. Bond, February 16, 1938.

Genus STRONGYLURA van Hasselt

Strongylura van Hasselt, Alg. Konst. Letter-Bode, No. 35, 1823; Bull. Sci. Nat. Férussac, vol. 2, p. 374, 1824. (Genotype, *S. caudimaculata* van Hasselt= *Belone strongylura* van Hasselt, 1823.) (Ref. copied.)

STRONGYLURA RAPHIDOMA (Ranzani)

AGUJA DE MAR O MONO

Belone raphidoma RANZANI, Novi Comment. Acad. Sci. Inst. Bonon., vol. 5, p. 359, pl. 37, figs. 1–5, 1842 (Brazilian seas).

Tylosurus raphidoma RÖHL, Fauna descriptiva de Venezuela, p. 375, 1942 (coast of Venezuela).

STRONGYLURA TIMUCU (Walbaum)

AGUJA

Esox timucu WALBAUM, *in* Artedi's Bibliotheca ichthyologica, vol. 3, p. 88, 1792 (Brazil) (after *Timucu* of Marcgrave).

U.S.N.M. No. 121782, 5 specimens, 218 to 235 mm. in standard length, Lago de Maracaibo at Yacht Club, Maracaibo, March 5, 1942.

U.S.N.M. No. 121784, 7 specimens, 72 to 128 mm., from Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 121783, 3 specimens, about 73 to 80 mm. (beaks broken), from Lago de Maracaibo, 2 miles off Lagunillas, March 15.

U.S.N.M. No. 121784, 3 specimens, about 67 to 208 mm., Lago de Maracaibo, 1 km. off Pueblo Viejo, April 7–8.

U.S.N.M. No. 121781, 5 specimens, 574 to 690 mm., from mouth of Río Concha, and in Lago de Maracaibo, May 2.

The base of the caudal fin of two specimens, 48 and 49 mm., Río Apure at San Fernando de Apture, F. F. Bond, February 16, 1938, has a distinct black spot not observed in those of small size from the Maracaibo Basin.

The large specimens from Lago de Maracaibo at the mouth of the Río Concha were apparently ready for spawning, as a light pressure on the abdomen of the females caused pale yellowish eggs to flow freely. The eggs probably adhere to the vegetation, as they appear to possess fine adhesive threads and were very sticky when touched.

Family HEMIRAMPHIDAE: Halfbeaks

The identifications for this family were made by Dr. Robert R. Miller, former associate curator of fishes, United States National Museum, during his investigation of this group of fishes for the purpose of describing a new species from Mexico.

Genus HYPORHAMPHUS Gill

Hyporhamphus GILL, Proc. Acad. Nat. Sci. Philadelphia, 1859, p. 131. (Genotype, *Hyporhamphus tricuspidatus* Gill=*Hemiramphus unifasciatus* Ranzani.)

HYPORHAMPHUS ROBERTI (Valenciennes)

HALFBEAK; BALAO O BALAJÚ

Hemirhamphus roberti VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 19, p. 24, 1846 (Cayenne).

U.S.N.M. No. 121818, a specimen, 57 mm. in standard length, Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 121816, a specimen, 103 mm., caño at Los Monitos, Río Limón system, March 11, 1942.

U.S.N.M. No. 121819, a specimen, 96.5 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121725, 2 specimens, 106 and 121 mm., Lago de Maracaibo at Yacht Club, Maracaibo, February 27, 1942.

U.S.N.M. No. 121820, 33 specimens, 14 to 102 mm., Lago de Maracaibo, 1 km. off Pueblo Viejo, April 7–8, 1942.

U.S.N.M. No. 121817, 12 specimens, 87 to 142 mm., Lago de Maracaibo at Yacht Club, Maracaibo, March 5, 1942.

HYPORHAMPHUS UNIFASCIATUS (Ranzani)

Hemiramphus unifasciatus Ranzani, Novi Comment. Acad. Sci. Inst. Bonon., vol. 5, p. 326, 1842 (Brazil) (ref. copied).

U.S.N.M. No. 123285, 1 specimen 195 mm. in standard length, Estanques Bay, U. S. S. *Niagara*, December 19, 1924.

Genus HEMIRAMPHUS Cuvier

Hemi-ramphus Cuvier, Le règne animal, vol. 2, p. 186, 1817. (Genotype, *Esox brasiliensis* Linnaeus.)

HEMIRAMPHUS BRASILIENSIS (Linnaeus)

Balajú

Esox brasiliensis Linnaeus, Systema naturae, ed. 10, p. 314, 1758 (Jamaica).
Hemirhamphus brasiliensis Röhl, Fauna descriptiva de Venezuela, p. 374, fig. 186, 1942 (coast of Venezuela).

Family EXOCOETIDAE: Flyingfishes

Genus EXOCOETUS Linnaeus

Exocoetus Linnaeus, Systema naturae, ed. 10, p. 316, 1758. (Genotype, *Exocoetus volitans* Linnaeus.)

EXOCOETUS VOLITANS Linnaeus

Pez volador

Exocoetus volitans Linnaeus, Systema naturae, ed. 10, p 316, 1758 (Atlantic Ocean).—Breder, Bull. Bingham Oceanogr. Coll., vol. 6, art. 5, p. 30, figs. 15, 17, 1938 (one station at entrance to Gulf of Venezuela).

Order CYPRINODONTOIDEA [15]

KEY TO THE CYPRINODONTS REPORTED FROM VENEZUELA

1*a*. Eyes bulging, in elevated sockets, the pupil divided by a horizontal cross partition, adapting the eye for vision above and below the surface of the water; anal fin of male with a scaly tube; space between upper edges of orbital ridges or rims equal to or less than diameter of eye; sides with obscure stripes; scales 81 to 90, 17 or 18 in a transverse series; caudal fin obliquely rounded (after Eigenmann) (family Anablepidae).

Anableps microlepis Müller

1*b*. Eyes normal, without cross partition.

2*a*. Orbital rim with its margin not free but fused with eye; first rays of anal fin of male not specialized (family Cyprinodontidae).

[15] *Lima heterandria* Regan (1913, p. 1017, pl. 101, figs. 3, 4, La Guaira, Venezuela) actually came from Santo Domingo according to Myers (1940, p. 172). *Heterandria zonata* Nichols, 1915, is a synonym. Dr. Hubbs has found that this species is a new one and that it actually came from La Guaira.

3*a*. Caudal peduncle greatly compressed, its lower edge bladelike; fins, especially caudal and pelvic, pointed and often greatly attenuated; dorsal rays about 10, origin considerably behind a vertical through anal origin over the base of the fourteenth anal ray; anal rays 22; color in alcohol dull yellowish brown with 11 narrow dark vertical bars on the sides, the last on the caudal peduncle; caudal fin with small blackish spots; scales about 34; pectoral rays 13; 12 scales from dorsal base to anal origin; about 28 or 29 predorsal scales to opposite pupil; 16 around caudal peduncle---------- **Pterolebias zonatus** Myers

3*b*. Lower edge of caudal peduncle not bladelike; cleft of mouth forming a right-angled groove or pocket in front of eye; preorbital line nearly vertical or even inclined slightly backward.

4*a* Dorsal rays 13 to 16; base of dorsal fin a little longer than that of anal fin; dorsal fin origin a little behind that of anal fin, usually over bases of first or second branched anal rays in females; anal rays 16 to 18; scales from upper edge of gill opening to caudal fin base 30 to 33 and usually 12 or 13 scales from anal origin to dorsal base; teeth in each jaw conical, recurved, in a relatively wide band of several irregular rows, the outer row considerably enlarged and widely spaced; caudal fin slightly but usually truncate; interradial membrane of caudal fin with fine scales in adults, lacking in half-grown and young---------- **Austrofundulus** Myers

5*a*. Number of scales in a zigzag row across breast between bases of pectoral fins about 5 or 6 and number of scales from lower edge of pectoral base to pelvic insertion about 9; greatest width of upper lip into length of upper lip between nostrils 3.8; length of pectoral fin into standard length 6⅔ times; coloration not known.

Austrofundulus transilis transilis Myers

5*b*. Number of scales across breast between pectoral bases 7 to 11 and from pectoral base to pelvic insertion 9 to 12; greatest width of upper lip into length of upper lip 3.9 to 4.6; length of pectoral fin into standard length 4.5 to 4.8; a dark bar below eye more or less obscure on females; anterior parts of body with black spots faint or absent on females; fins plain in color.

Austrofundulus transilis limnaeus, new subspecies

5*c*. Number of scales across breast between pectoral bases 10 to 14 and from pectoral base to pelvic insertion 12 to 14; greatest width of upper lip into length of upper lip 2.5 to 3.6; length of pectoral fin into standard length 3.8 to 4.5; bar below eye barely visible; body plain in color; basal parts of both dorsal and anal fins with several darkish spots just visible, the row of 4 or 5 at base of fin most intense---------- **Austrofundulus stagnalis**, new species

4*b*. Dorsal fin base much shorter than anal fin base; dorsal origin considerably behind that of anal fin; all fins rounded, no produced pelvic rays.

6*a*. Dorsal rays 8 to 10; head considerably wider than its greatest depth; body but little compressed, elongate (*Rivulus* Poey).

7*a*. Scales from upper edge of gill opening to midcaudal fin base about 29; origin of dorsal three-fourths the distance from middle of the eye to base of caudal fin; origin of anal halfway from head to caudal; origin of dorsal nearly over middle of anal base; anal rays 6, dorsal 8---------- **Rivulus obscurus** Garman

7*b*. Scales 35 to 43; origin of dorsal usually a little behind middle of anal base.

8*a*. Branched rays of dorsal 5 or 6, usually 6; of anal 11 to 14; total rays of pectoral 13 to 15; scales 35 to 38; 3 or 4 rows of spots on lower half of body most prominent.

Rivulus hartii (Boulenger)

8*b*. Branched rays of dorsal 8; of anal 13 to 15, seldom 13; total rays of pectoral 15 to 17; scales 37 to 41; two rows of spots on lower side of young and half grown most prominent.

Rivulus holmiae Eigenmann

8*c*. Branched rays of dorsal 6 or 7, occasionally 6; of anal 12 to 15, usually 14; total rays of pectoral 14 to 16; scales 38 to 41; all rows of spots on females and young of about same prominence---------- **Rivulus bondi**, new species

6*b*. Dorsal rays 11 or 12; head as deep as broad; body compressed, tail more so; anal rays 12 or 13; pectoral 14; scales 30 to 32, 10 or 11 below origin of dorsal; color brownish, upper parts of head and back darker; scales of opercle each with a large white or bluish white spot; some scales of preopercle with similar spots, similar but smaller spots scattered on some of the scales of the body and tail; a dusky vertical band through eye and suborbital region, a less distinct one along hind border of preopercle; dorsal, sometimes anal and pelvics, with rows of dusky spots; caudal dusky, with vertical rows of dark spots, but lower lobe of fin pure white, sharply contrasting with the rest--**Rachovia hummelincki** De Beaufort

2*b*. Oribital rim with a free margin.

9*a*. Anal rays of males unmodified.

10*a*. Teeth in both jaws in a single series of 3-pointed incisors, with middle point a little longer and broader; origin of dorsal fin midway between caudal fin base and snout; anal origin under rear of dorsal fin base or a little behind base; depth 2⅓ to 2⅔, head 2.7 to 2.9 in standard length; gill membranes broadly united with a wide free fold across the isthmus; about 23 or 24 rows of scales from head to midcaudal fin base; humeral scale enlarged; dorsal rays ii, 8 or ii, 9; anal rays usually ii, 8; a narrow blackish bar across base of caudal fin; sides of body with dark bars or males may lack the dark bars and have a dark streak along middle of sides; dorsal and anal fins often with a black spot posteriorly except in mature males; an elongate black bar occurs at front of fins; also in the males the fins are more elongate and more heavily pigmented.

Cyprinodon dearborni Meek

10*b*. Teeth simple, conical, in two series at front of both jaws; diameter of eye greater than length of snout; interorbital flat; maxillary and anterior edge of preorbital oblique, the upper corner farther forward than lower; no angular pocket formed at dorsal edge of preorbital; dorsal origin equidistant between midcaudal fin base and front of margin of eye; anal origin very slightly closer to rear margin of eye than midcaudal fin base; anal origin behind a vertical line through dorsal origin; caudal fin rounded; gill rakers short, about 10 on lower part of first gill arch; the row of scales along middle of sides much larger than those above and below this row; dorsal rays i, 12; anal iii, 7; pectoral rays 15–15; pelvics 7–7; scales 32; scales before dorsal 9 + 3 or 4 enlarged ones on top of head; scales in zigzag row around caudal peduncle 14, and 8 from dorsal origin to anal fin base; about 12 scales on breast in front of pelvics, the middle row not regularly placed and not enlarged.

Hubbsichthys laurae, new genus and species

9*b*. Anal fin of males modified, the first 3 branched rays or rays 3, 4, and 5 greatly elongate with remarkably developed and specialized tips; dorsal origin in middle of length from caudal fin base and postoribtal part of head; teeth, minute conical, in villiform bands on jaws; depth and head more than 3 times in the standard length; pelvic fins enlarged and modified in the male, the first ray with a swollen tip, the second ray thickened and greatly elongate; a membranous swelling along anterior margin of gonopodium modified into a prepucelike hood (family Poecilidae).

11*a*. Ray 3 of anal fin with retrorse spines along anterior margin, the proximal spine-bearing segments subspinous on posterior margin and no terminal hook; tips of all rays slender; origin of dorsal fin of female scarcely behind that of anal; subdistal segments of anterior branch of ray 4 short and spiniferous; processes of ray 5 distinctly spinous; usually a blackish spot a little above midaxis near tip of pectoral fin; upper and lower edges of caudal fin base often edged with blackish; scale rows along side behind head to caudal fin base about 24 or 25.

Poecilia vivipara Bloch and Schneider

11*b*. Ray 3 without processes on posterior margin and terminal hook weakly or not at all developed.

12a. Spines on anterior margin of ray 3 strong but terminal hook wholly undeveloped; tips of all rays of gonopodium slender; anterior branch of ray 4 often with weak serrae on posterior margin; males variously black spotted and with black streaks, the females plain in coloration; scale rows head to caudal fin base 25 to 27; pectoral fins usually ii, 12; dorsal ii, 6; no black spot on dorsal fin and no vertical dark bars_____**Lebistes reticulatus** (Peters)

12*b*. Sides of males with vertical darkish bars, a little wider than pale interspaces, these bars mostly absent on females, the width of the dark bars about equal to that of pupil and usually two of these dark bars beyond tip of depressed dorsal fin; dark bars fading ventrally and dorsally; dorsal fin with a large black blotch basally on posterior rays, base of anterior rays hyaline; middle of dorsal fin hyaline, then tips of dorsal rays blackish; prepucelike hood at tip of third anal ray usually blackish or grayish; about 26 or 27 scales; dorsal rays ii,6, anal iii,6 (Maracaibo Basin).

Mollienisia caucana (Steindachner)

12*c*. Ray 3 with long more or less spinous processes on posterior margin; terminal hook of ray 3 usually weakly developed; tips of all the gonopodial rays slender; segments of anterior branch of ray 4 without trace of serrae and not markedly elongate; anterior margin of ray 3 with strong spines; origin of dorsal approximately over that of anal in female; dorsal and caudal fins with numerous small black spots or in young a small blackish spot or group of spots near midcaudal fin base; sides of body without or with indistinct narrow vertical bars; about 26 or 27 scale rows; pectoral rays usually ii,12 or 13; dorsal rays ii,6, anal iii, 6.

Mollienisia sphenops vandepolli (Van Lidth de Jeude)

Family ANABLEPIDAE

Genus ANABLEPS Scopoli

Anableps Scopoli, Introductio ad historiam naturalem, p. 450, 1877. (Genotype, *Cobitis anableps* Linnaeus.)

ANABLEPS MICROLEPIS Müller

FOUR-EYED-FISH; CUATRO OJOS

Anableps microlepis MÜLLER, Monatsb. Verh. Ges. Erdkunde Berlin, 1844, p. 36.—FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1911, p. 436 (Pedernales, Venezuela); 1916 p. 439 (Pedernales, Venezuela).

Family CYPRINODONTIDAE

Genus PTEROLEBIAS Garman

Pterolebias GARMAN, Mem. Mus. Comp. Zool., vol. 19, p. 141, 1895. (Genotype, *Pterolebias longipinnis* Garman.)

PTEROLEBIAS ZONATUS Myers

Pterolebias zonatus MYERS, Proc. Biol. Soc. Washington, vol. 48, p. 7, 1935 (Estado de Guárico, in ponds in Orinoco Basin, Venezuela).

U.S.N.M. No. 92190, holotype of *P. zonatus* Myers.

FIGURE 10.—*Austrofundulus transilis limnaeus*, new subspecies: Holotype (U.M.M.Z. No. 141916), 61 mm. in standard length. Drawn by Mrs. Nancy Patton.

Genus AUSTROFUNDULUS Myers

Austrofundulus MYERS, Proc. Biol. Soc. Washington, vol. 45, p. 160, 1932. (Genotype, *Austrofundulus transilis* Myers.)

AUSTROFUNDULUS TRANSILIS TRANSILIS Myers

Austrofundulus transilis MYERS, Proc. Biol. Soc. Washington, vol. 45, p. 160, 1932 (Orinoco drainage of Estado de Guárico in ponds, Venezuela).

U.S.N.M. No. 92191, holotype of *A. transilis* Myers.

AUSTROFUNDULUS TRANSILIS LIMNAEUS, new subspecies

FIGURE 10

Austrofundulus transilis MYERS, Stanford Univ. Bull., vol. 2, No. 4, p. 110, figs. 13, 14, 1942 (15 km. west of San Félix, Estado de Falcón, Venezuela).

Holotype.—U.M.M.Z. No. 141916, 61 mm. in standard length, collected by F. F. Bond (Field Coll. No. 86) 15 km. west of San Félix,

which is at western border of Estado de Falcón, Venezuela, March 21, 1938. [In lower Río Cocuiza.]

Paratypes.—U.M.M.Z. No. 141917, 32 specimens, 38.5 to 73 mm., taken along with the holotype and bearing same data.

In addition, I have examined two specimens reported upon by Dr. De Beaufort as *A. transilis* from Pozo del Arroyo de Aparó, El Cardón, Goajira, that I refer to this species.

TABLE 10.—*Counts and measurements made on species of* Austrofundulus. (*All measurements are expressed in hundredths of the standard length.*)

Characters	Species						
	transilis	*limnaeus*			*stagnalis*		
	Holotype	Holotype	Paratype	Paratype	Holotype	Paratype	Paratype
Standard length in millimeters	40.0	61.0	45.5	45.0	31.5	32.6	32.5
Length of head	33.2	31.2	36.5	39.5	36.2	37.7	37.5
Greatest depth of body	32.0	36.1	32.0	35.6	29.5	29.2	28.9
Length of snout	9.50	9.02	7.90	9.55	11.1	10.4	11.1
Diameter of eye	9.75	7.54	10.3	9.11	8.57	8.60	8.30
Postorbital length of head	17.0	17.9	20.7	18.9	21.9	22.1	23.1
Width of fleshy interorbital space	14.3	13.9	12.7	13.6	14.6	15.0	15.7
Length from base of last anal ray to midcaudal fin base	23.8	23.1	23.1	22.5	21.3	20.3	20.0
Least depth of caudal peduncle	16.7	17.2	16.0	17.8	17.8	15.3	15.4
Greatest width of head	20.0	20.5	22.6	21.1	23.8	23.3	22.8
Depth of head at occiput	25.0	26.2	23.1	22.2	26.1	25.2	26.1
Length of upper lip	9.50	9.02	9.22	8.22	11.1	11.0	11.4
Greatest width of upper lip	2.50	1.97	2.42	1.78	3.17	3.68	3.69
Snout to dorsal origin	68.2	67.4	69.2	68.9	68.6	69.0	66.8
Snout to anal origin	60.2	60.6	63.7	60.7	61.9	62.9	63.7
Snout to pectoral insertion	32.8	32.8	35.2	36.5	36.8	37.7	36.9
Snout to pelvic insertion	53.8	51.6	57.2	52.6	53.6	54.6	52.3
Length of longest fin ray of: dorsal	20.0	23.3	19.2	22.2	24.8	25.6	26.8
anal	17.5	19.0	24.6	21.1	28.6	28.2	29.8
pectoral	15.0	23.0	23.1	22.2	23.8	25.6	24.9
pelvic	11.3	12.3	13.2	12.5	12.7	13.8	13.2
Length of depressed dorsal fin	31.5	37.7	33.2	33.0	36.5	36.8	40.6
Length of depressed anal fin	30.8	-------	33.0	35.6	40.0	41.4	41.8
Length of base of dorsal fin	18.8	23.4	18.7	18.9	21.3	19.3	21.5
Length of base of anal fin	20.0	23.4	17.2	21.1	20.0	22.7	21.5
Dorsal rays (counting all rays)	14	14	15	14	14	14	14
Anal rays (counting all rays)	16	16	16	18	17	17	17
Pectoral rays (counting all rays)	16–16	15–15	16–16	—–18	17–17	15–16	16–15
Pelvic rays (counting all rays)	8–8	7–7	8–8	8–8	8–8	8–8	8–8
Gill rakers on first arch	2+13	-------	3+15	3+14	-------	3+12	3+13
Scale rows from head to midcaudal fin base	32	30	32	32	31	33	32
Number of scales in a row from origin of anal fin to dorsal fin	12	12	13	13	13	12	13
Number of scales in a zigzag row across breast between bases of pectoral fins	5	8	10	8	13	11	11
Number of scales between pectoral and pelvic fin bases	9	11	10	9	14	13	14
Number of scales in zigzag row around caudal peduncle	17	20	19	19	20	18	18

Description.—The description is based on the holotype and paratypes. Detailed measurements and counts are recorded in tables 10 and 11.

Head depressed, body compressed posteriorly, interorbital space flat except on large males that have the top of head including interorbital space swollen and fleshy as shown in drawing (Myers, *l. c.*, fig. 13); profile on females and young nearly straight; tip of lower jaw not quite entering profile when mouth is closed; margin of eye not free; teeth essentially as in *stagnalis*, but inner row of villiform band with the teeth a little larger than others in this band; anterior nostrils tubular, posterior nasal opening a slit above front of eye; cheek and operculum scaled; top of head scaled forward, a little in front of a line between front of orbits; caudal fin scaled from one-half to four-fifths the way out the rays, farther in the largest specimens; scales on breast only a little smaller than on sides; anus immediately in front of anal origin; gill rakers about 3 + 14 or 15; caudal fin with truncate rear margin; middle rays of paired fins longest; usually the sixth from last ray of both dorsal and anal fins longest; pectoral fins usually reach just to pelvic insertions or a little past but not to anus; pelvics reach past anal origin; dorsal and anal fins when depressed reach to base of caudal fin; dorsal origin equidistant between midcaudal fin base and rear of head or a little behind head; anal origin in front of a vertical line through dorsal origin and equidistant between midcaudal fin base and middle of postorbital length of head to rear of head; dorsal origin about over base of second branched ray of anal fin; caudal peduncle longer than deep in females or its length equal to its depth in large males; caudal fin a little longer than eye and postorbital length of head, anal fin of female with distal part of first or second to sixth anal rays hardened and more or less fused into a glandlike pad.

Coloration.—In alcohol, pale tan with dark spots anteriorly on adult males; a dark bar below eye more prominent on males; several very faint small pale grayish spots on dorsal fin almost beyond visibility, none can be seen on anal fin; caudal fin of adult males blackish.

TABLE 11.—*Counts made on species of* Austrofundulus

Species	Total number of fin rays							Number of scales															
	Dorsal				Anal			In a zigzag row across breast between pectoral bases										From pectoral base to pelvic base					
	13	14	15	16	16	17	18	5	6	7	8	9	10	11	12	13	14	9	10	11	12	13	14
transilis	---	1	---	---	1	---	---	1	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---
limnaeus	3	11	2	1	10	7	---	---	---	2	5	6	3	1	---	---	---	4	7	4	1	---	---
stagnalis	---	11	6	---	1	13	3	---	---	---	---	---	1	1	6	4	2	---	---	---	2	4	4

Remarks.—This new subspecies may be distinguished from the other members of the genus by means of the key on page 82. It has longer pectoral fins than *A. transilis transilis* and more numerous scales on its breast, whereas *stagnalis* has more numerous scales on its breast than *limnaeus*.

Named *limnaeus* in reference to its habitat in ponds.

AUSTROFUNDULUS STAGNALIS, new species

FIGURE 11

Austrofundulus transilis (in part) MYERS, Stanford Ichthy. Bull., vol. 2, No. 4, p. 110, 1942 (20 km. south of Lagunillas, Venezuela).

Holotype.—U.M.M.Z. No. 141918, 31.5 mm. in standard length, collected by F. F. Bond (Field Coll. No. 91) about 6 km. north of the Río Misoa and 20 km. south of Lagunillas, Maracaibo Basin, March 23, 1938.

Paratypes.—U.M.M.Z. No. 141919, 103 specimens, 14.5 to 34 mm. in standard length, taken along with the holotype and bearing same data; U.S.N.M. No. 121691, 125 specimens, 9 to 20 mm., collected by Leonard P. Schultz in a roadside pond, tributary to Río Cocuiza, 10 km. west of El Mene, Venezuela.

Description.—The description is based on the holotype and paratypes. Detailed measurements and counts are recorded in tables 10 and 11.

Head depressed, body compressed posteriorly, interorbital flat or nearly so; profile of head straight or with a slight concavity opposite orbits; tip of the lower jaw entering profile when mouth is closed; margin of eye not free; outer row of teeth in both jaws formed by conical teeth, widely spaced and larger than the wide villiform band behind them; anterior nostrils tubular, posterior nasal opening above front of eye; cheek and operculum scaled; top of head scaled to a line between front of eye; on largest specimens the caudal fin is scaled not quite halfway out; scales on breast much smaller and more crowded than on sides; anus immediately in front of anal origin; gill rakers short, about 2 or 3 + 12 or 13; caudal fin truncate; middle rays of pectorals and pelvics longest; about fifth or sixth from last ray of both dorsal and anal fins longest; pectoral fins reach to the anus and pelvic fins reach past anal origin; dorsal and anal fins when depressed reaching a little past base of caudal fin; dorsal origin equidistant between midcaudal fin base and rear of head or to upper edge of gill opening; anal origin in front of a vertical line through dorsal origin and equidistant between midcaudal fin base and posterior edge of preopercle; dorsal origin about over base of second branched ray of anal fin; caudal peduncle a little longer than deep; length of caudal fin about equal to eye and postorbital length of head.

Coloration plain pale brownish; darker above and paler underneath; below eye is a trace of a short indistinct dark bar; dorsal and anal fins with several darkish spots barely visible.

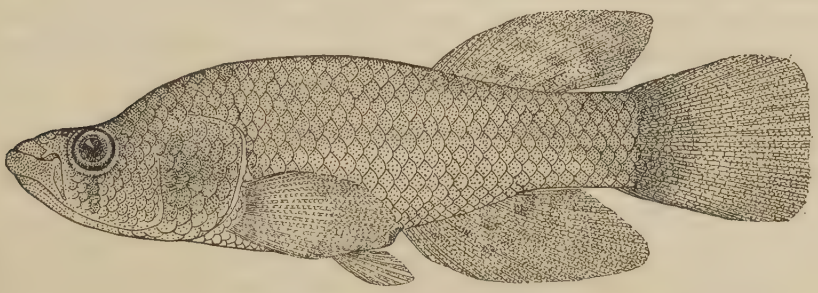

FIGURE 11.—*Austrofundulus stagnalis*, new species: Holotype (U.M.M.Z. No. 141918), 31.5 mm. in standard length. Drawn by Mrs. Aime M. Awl.

Remarks.—This new species may be distinguished from the other two forms in the genus *Austrofundulus* by its wider upper lip, longer pectoral fins, and crowded small scales on the breast. The key on page 82 should enable the reader to identify this species from the other two.

Named *stagnalis* in reference to its habit of living in stagnant ponds or pools.

Genus RIVULUS Poey

Rivulus POEY, Memorias sobre la historia natural de la isla de Cuba, vol. 2, p. 307, 1861. (Genotype, *Rivulus cylindraceus* Poey.)

RIVULUS OBSCURUS Garman

Rivulus obscurus GARMAN, Mem. Mus. Comp. Zool., vol. 19, p. 140, 1895 (Lake Hyanuary).—PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 157, 1899 (Río Apure, Venezuela).

It is probable that Pellegrin's record for the Apure River actually is for another species and his material should be restudied.

RIVULUS HARTII (Boulenger)

Haplochilus hartii BOULENGER, Ann. Mag. Nat. Hist., ser. 6, vol. 6, p. 190, 1890 (Trinidad).—REGAN (in part), Proc. Zool. Soc. London, 1906, pt. 1, p. 389, pl. 21, fig. 2 (Trinidad; Venezuela).

Dr. William Beebe kindly turned over to me a specimen 31.5 mm. in standard length collected by him May 23, 1942, at Caripito, that I tentatively identify with this species. Its caudal fin is more pointed than usual in *Rivulus*.

The two specimens before me (U.S.N.M. No. 94308) from Pitch Lake, Trinidad, have 6 branched dorsal rays, 11 branched anal rays,

and 13-13 pectoral rays. Regan's figure (*l.c.* pl. 21, fig. 2), probably of the type of *hartii*, also shows 13 pectoral rays. Another important character is the presence of only 6 branched dorsal rays in *hartii*. Among the material of *Rivulus* available from Venezuela I fail to find specimens that consistently agree with *hartii*, although collections made in British Guiana and Brazil appear to agree fairly well with my material from Trinidad, the type locality of *hartii*.

RIVULUS HOLMIAE Eigenmann

Rivulus holmiae EIGENMANN, Ann. Carnegie Mus., vol. 6, p. 50, 1909 (Holmia, British Guiana).

Rivulus hartii MYERS, Copeia, 1924, No. 135, p. 96 (Margarita Island, Venezuela); Stanford Ichthyol. Bull., vol. 1, No. 5, p. 171, 1940 (Margarita Island).—DE BEAUFORT, Freshwater fishes from the Leeward group, Venezuela and eastern Colombia. Studies on the fauna of Curaçao, Aruba, Bonaire, and the Venezuelan islands, vol. 2, p. 110, 1940 (Margarita Island).

U.S.N.M. No. 94150, 1 specimen, 71 mm. in standard length, El Valle, Isla de Margarita, Austin H. Clark.

U.M.M.Z. Collection 142, 75 specimens, 14 to 73 mm., Río Porlamar at El Valle, Isla de Margarita, F. F. Bond (lent by Dr. Carl L. Hubbs), April 1, 1939.

Upon studying a series of specimens from El Valle, Isla de Margarita, Venezuela, and comparing them with a paratype of *Rivulus*

TABLE 12.—*Measurements made on certain species of* Rivulus *expressed in hundredths of the standard length*

Characters	*hartii*			*holmiae*	*bondi*		
	Caripito N.Y.Z.S. No. 30239	Trinidad U.S.N.M. No. 94308		Margarita Island U.S.N.M. No. 94150	Caripito N.Y.Z.S. No. 30015 Paratype	U.M.M.Z. Holotype	U.M.M.Z. Paratype
Standard length	31.5	36.0	30.5	71.0	66.0	40.2	50.5
Length of head	27.0	27.8	27.8	26.2	26.2	29.2	27.1
Greatest depth	20.0	22.8	19.7	22.5	20.4	19.9	19.6
Length of snout	6.35	7.50	8.20	8.04	8.33	8.70	8.32
Diameter of eye	8.26	9.44	9.84	7.04	6.52	7.96	7.92
Postorbital length of head	14.0	12.8	13.8	12.7	12.9	14.2	13.1
Interorbital space	12.7	13.9	14.1	14.1	12.9	11.2	12.5
Length of caudal peduncle	21.3	20.0	20.0	19.7	18.9	16.2	16.4
Least depth of caudal peduncle	13.3	14.4	13.1	15.5	13.5	12.9	12.9
Greatest width of head	----------	18.1	19.0	20.3	19.9	19.7	17.8
Snout to dorsal origin	81.0	77.8	80.3	72.5	73.0	77.4	77.2
Snout to anal origin	66.7	61.4	63.6	57.0	61.5	63.4	61.0
Snout to pectoral insertion	26.7	26.7	28.5	26.8	26.0	29.6	27.7
Snout to pelvic insertion	54.0	51.4	55.4	48.0	51.5	51.2	51.5
Length of longest dorsal ray	13.7	16.7	15.1	14.4	14.1	16.7	17.2
Length of longest anal ray	15.9	16.7	15.4	15.1	13.3	15.2	17.2
Length of longest pectoral ray	21.1	17.8	17.0	18.3	17.0	18.9	17.6
Length of longest pelvic ray	9.52	8.05	9.18	10.6	7.72	9.95	10.3
Length of longest caudal ray	27.0	25.3	25.6	23.2	24.2	26.6	25.0
Length of depressed dorsal fin	20.3	21.9	21.0	24.7	22.7	23.1	24.2
Length of depressed anal fin	31.8	32.0	28.8	36.6	31.8	32.3	36.6
Length of base of dorsal fin	6.67	8.33	8.85	12.4	10.6	10.5	10.5
Length of base of anal fin	19.4	20.3	19.7	25.9	23.6	22.4	23.7

TABLE 13.—*Counts made on certain species of* Rivulus

Species	Branched fin rays: Dorsal				Anal							Pectoral fin rays						Number of scales: Dorsal origin to anal fin					Zigzag row between bases of pectoral fins across breast				
	5	6	7	8	9	10	11	12	13	14	15	12	13	14	15	16	17	9	10	11	12	13	8	9	10	11	12
holmiae [1]				17					1	15	3				12	15	1	4	3						6	1	
hartii [2]	1	13					6	2	4	2			5	8	3			7	1	1				7	1		
bondi [3]		3	20					1	3	14	5			2	14	7		14						10	3		
dorni [4]			1	2		2	1						1	4				2	1					3			
elegans [5]			1						1					2								1					1
beniensis [6]	2				2								3	1				2					1	1			
stagnatus [7]		1					1					1	1							1				1			

Species	Number of scales from head to midcaudal fin base																	Number of scales in front of dorsal fin to occiput												
	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
holmiae [1]								1	3	5	2	2												1	2	4	4	1						
hartii [2]						3	4	4	1															2	4	2		2						
bondi [3]									3	8	2	1													2	7	5							
dorni [4]	1	2																2	1															
elegans [5]										1																		1		1				
beniensis [6]				2																								1						
stagnatus [7]																	1																	1

[1] U.S.N.M. No. 66302 and Margarita Island.
[2] U.S.N.M. Nos. 88282, 94308, 88295, 130644.
[3] From Caripito.
[4] U.S.N.M. No. 92966.
[5] U.S.N.M. No. 117622.
[6] U.S.N.M. No. 120432.
[7] U.S.N.M. No. 66303.

holmiae Eigenmann (U.S.N.M. No. 66302) and finding no significant differences, I decided to identify the specimens, at least tentatively, with *holmiae* from British Guiana. This leaves a problem concerning the distribution of *holmiae* to be studied when adequate series of this form are collected in the intervening territory, but until material is available it is preferable to leave the form on Margarita Island unnamed.

My chief basis for referring the specimens from the Isla de Margarita to *holmiae* was the fin-ray and scale counts and coloration which appear to agree in alcohol. It should be noted that in recording the dorsal and anal rays I have included only the branched rays in table 12.

Dr. George S. Myers (1924, p. 96, and 1940, p. 171) has reported *Rivulus hartii* from Margarita Island, Venezuela, based on U.S.N.M. No. 94150, but I find that this specimen, as well as all the others from that island that I have studied, has 8 branched dorsal rays instead of 6 as in *hartii* from Trinidad; thus Ir efer Myers's records to the synonymy of *holmiae*.

RIVULUS BONDI, new species

FIGURE 12

? *Haplochilus harti* REGAN (in part), Proc. Zool. Soc. London, 1906, pt. 1, p. 389 (Venezuela).

Rivulus harti REGAN (in part), Ann. Mag. Nat. Hist., ser. 8, vol. 10, p. 501, 1912 (Venezuela).—MYERS (in part), Ann. Mag. Nat. Hist., ser. 9, vol. 19, p. 123, 1927 (Venezuela to Columbia).

? *Rivulus micropus* (non Steindachner) GÜNTHER, Catalogue of the fishes in the British Museum, vol. 6, p. 328, 1866 (Venezuela).—EIGENMANN AND ALLEN (in part), Fishes of western South America, p. 346, 1942 (Venezuela).

Holotype.—U.M.M.Z. No. 141914, a female, 40.2 mm. in standard length, collected at La Florida, Caracas, Venezuela, in a quebrada caño tributary to the Río Guaire, by F. F. Bond, January 10, 1938.

Paratypes.—U.M.M.Z. No. 141915, 126 specimens, 14 to 59 mm., taken along with the holotype and bearing same data.

U.M.M.Z. No. 141929, 9 specimens, 20.5 to 36.5 mm., from a lagoon 3 km. northwest of Petare, Venezuela (Río Guaire system), collected by F. F. Bond, January 15, 1939.

Dr. William Beebe kindly turned over to me for report the following specimens collected in Venezuela in 1942:

N.Y.Z.S. No. 30015, 5 specimens, 32.5 to 67 mm., Caripito.

N.Y.Z.S. No. 30234, 1 specimen, 54 mm., East Caripito Creek, near Caripito, March 6.

Description.—The description is based on the holotype and paratypes listed above. Detailed measurements were made and these are recorded in table 12 for the holotype and two paratypes.

The following counts were made, respectively, for the holotype and a

paratype from Caracas: Dorsal rays ii, 7 (ii, 7); anal rays iii, 14 (ii, 15); pectoral rays 16–15 (15–16); pelvic rays i, 6–i, 6 (i, 6–i, 6); scales from upper edge of gill opening to midcaudal fin base 38 (39); scales from dorsal origin to front of anal 9 (9); scales in front of dorsal fin to occiput 27 (28); number of scales in a zigzag row around caudal peduncle 15 (16); scales in a zigzag row across breast between lower edges of base of pectoral fin 9 (10).

FIGURE 12.—*Rivulus bondi*, new species: Holotype (U.M.M.Z. No. 141914), 40.2 mm. in standard length. Drawn by Mrs. Aime M. Awl.

Head depressed, but body compressed posteriorly, the greatest depth about 5 and head 3.5 in standard length; margin of eye not free; eye equal to snout and about 3⅔ in the head; interorbital wider than eye and about 2 in the head; rear margin of eye a trifle closer to rear of head than tip of snout; origin of dorsal to midcaudal fin base contained 2.9 times in distance from tip of snout to dorsal origin; origin of anal fin a trifle closer to midcaudal fin base than middle of postorbital length of head; base of last anal ray under the base of third from last ray of dorsal fin in posterior half of base of dorsal fin; pectoral fins reaching more than halfway to anal origin but not to bases of pelvics; pelvic fins reach just to anal origin; least depth of caudal peduncle contained about 1.3 in length of peduncle from base of last anal ray to midbase of caudal fin; caudal fin rounded; distal margin of anal fin rather straight; pectorals, pelvics, and dorsal with rounded margins; usually fourth from last ray of dorsal and anal fins longest.

Coloration.—The color in alcohol of the holotype consists of a light brownish background with rows of dark brown spots on sides, mostly posteriorly, the row along midaxis most prominent and beginning behind head, the other rows paler forward; each row of black spots corresponds to a row of scales and the dark spot is at center of each scale; dorsal and caudal fins barred, with a black ocellate spot at upper caudal fin base; bases of last two dorsal rays with a pale spot enclosed above by a brownish bar on base of fin; undersides in front of pelvics plain in color; underside of head finely pigmented; dorsal side of head and back dark brownish; lower lip or chin brownish; margin of anal fin and outer edge of pelvic fins blackish; pectorals finely pigmented.

The coloration of the adult males is considerably different from the

females since the males lack the rows of spots on the sides and the ocellate black spot on upper caudal fin base; back and sides blackish brown, gradually becoming paler underneath; sides of body with rows of pale specks corresponding to center of each scale; dorsal and anal fins faintly barred; blackish color of body continuing to end of caudal fin, forming a wide band on middle four-fifths of caudal fin, sharply contrasting with the white dorsal and ventral edges of this fin; pectorals dark; margin of anal and of pelvics black edged; chin and underside of head as in females.

Remarks.—This new species traces down to *Rivulus harti* in the key prepared by Regan (1912, pp. 495–496) but it differs from that species as indicated in the key on page 83 and the counts differ somewhat as indicated in table 13.

Named *bondi*, in honor of Dr. F. F. Bond, who collected this species.

Genus RACHOVIA Myers

Rachovia Myers, Ann. Mag. Nat. Hist., ser. 9, vol. 19, pp. 116, 119, 1927. (Genotype, *Rivulus brevis* Regan.)

RACHOVIA HUMMELINCKI de Beaufort

Rachovia hummelincki de Beaufort, Studies on the fauna of Curaçao, Aruba, Bonaire, and the Venezuelan Islands, vol. 2, p. 110, pl. Xb, 1940 (Península de Paraguana, Poza de San Antonio, east of Carirubana, Venezuela).

Genus CYPRINODON Lacepède

Cyprinodon Lacepède, Histoire naturelle des poissons, vol. 5, p. 486, fig., 1803. (Genotype, *Cyprinodon variegatus* Lacepède.)

CYPRINODON DEARBORNI Meek

Guajacon

Cyprinodon dearborni Meek, Publ. Field Columbian Mus. (Zool.), vol. 7, No. 7, p. 208, 1909 (Willemstad, Curaçao, Dutch West Indies).

Cyprinodon cyaneostriga Ahl, Zool. Anz., vol. 124, p. 58, 1938 (Curaçao, in sea and in strong brackish water).

U.S.N.M. No. 121692, 147 specimens, 11 to 45 mm. in standard length, Salina Santa Rosa, 3 km. north of Maracaibo in a pool with a specific gravity reading of 1.029 and a temperature of 98° F., February 20, 1942.

The following collections were made by Dr. F. F. Bond and were lent for report by Dr. Carl L. Hubbs, University of Michigan.

1 specimen, 13.2 mm., from cemeterío, Puerto Cabello, January 26, 1938.

73 specimens, 8.2 to 27.4 mm., saline lagoon 5 km. west of Cumaná, March 25, 1939.

1 specimen, 12 mm., coastal lagoon 15 km. north of Maracaibo, April 6, 1938.

63 specimens, 10 to 27.5 mm., lagoons, Tucacas, Estado de Falcón, 60 km. northwest of Puerto Cabello, January 29, 1939.

2 specimens, 24 and 26 mm., Laguna del Río Capatárida, 5 km. north of Capatárida, March 4, 1938.

50 specimens, 12.5 to 27.5 mm., tidal pools, Puerto Cabello, January 26, 1938.

280 specimens, 10.5 to 27.2 mm., lagoon 3 km. northwest of Barcelona, March 22, 1939.

453 specimens, 10.2 to 28 mm., bajo seco east side of Puerto Cabello, January 26, 1938.

HUBBSICHTHYS, new genus

Genotype: Hubbsichthys laurae, new species.

This new genus of Fundulinae is characterized by the free orbital margin; eye diameter a little greater than the snout; interorbital space flat, much wider than eye diameter; premaxillaries protractile; lower jaw oblique; maxillary and anterior edge of the preorbital oblique, not quite vertical, no angular pocket formed along front of preorbital; fine conical teeth in upper jaw in two rows anteriorly, but laterally forming a patch that ends in a sharp angular point posteriorly; teeth in lower jaw in two rows; dorsal origin in advance of that of anal fin; dorsal origin equidistant between midcaudal fin base and front margin of eye; anal origin very slightly closer to rear margin of eye than midcaudal fin base; caudal fin rounded; gill rakers about 10 on lower part of first gill arch, short; gill membranes extending forward to under pupil where they join forming a free fold; the row of scales along middle of side much larger than those above and below; base of caudal fin scaled.

Remarks.—The genus may be recognized from the American genera related to *Rivulus* as discussed by Myers (1927) by having a free orbital margin and from other genera by a combination of characters, as dorsal origin in advance of anal origin; an enlarged row of scales along midsides, with smaller scales in the rows above and below; cleft of mouth evenly curved and oblique; preorbital edge oblique without angular pocket at upper edge; flat interorbital space, and small conical teeth in two rows in both jaws. From *Chriopeoides* Fowler (Notulae Naturae No. 35, p. 4, 1939, Jamaica) with which this new genus is related it differs by having the upper edges of the preorbital a little farther forward than the lower corner, so that the preorbital edge slants forward, while in *Chriopeoides* the slant is in the opposite direction; scales on breast in front of pelvic bases smaller than on sides, the middle row irregular, with about 12 scales, while in *Chriopeoides* the midventral row is very regular on breast, as large as scales on sides, and number 8 scales. There are 12 scales in a zigzag row around caudal peduncle instead of 14 as in *Hubbsichthys*. Interorbital space very slightly convex in *Chriopeoides* but flat and on level of upper rim of orbit in *Hubbsichthys*.

One of the paratypes of *Chriopeoides pengelleyi* Fowler, A.N.S.P. No. 68633, was kindly lent for examination by Henry W. Fowler, of the Academy of Natural Sciences of Philadelphia.

Named *Hubbsichthys* in honor of Dr. Carl L. Hubbs, of the Scripps Institution of Oceanography, La Jolla, Calif., who has contributed much knowledge concerning the cyprinodont fishes.

HUBBSICHTHYS LAURAE, new species

FIGURE 13

Mollienisia caucana GABALDON (in part), Journ. Parasit., vol. 21, No. 4, pp. 311–312, 1935 (Pampán, Trujillo, Venezuela).

Holotype.—U.S.N.M. No. 120999, a specimen, 14 mm. in standard length, collected near Pampán, Estado de Trujillo, Venezuela, by Dr. Arnoldo Gabaldon, in 1935 and probably in Río Motatán drainage.

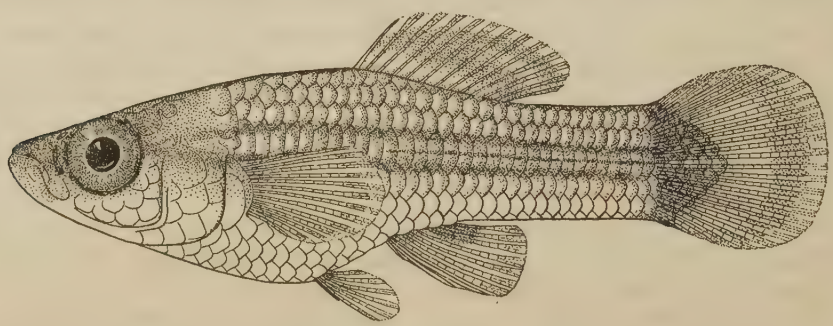

FIGURE 13.—*Hubbsichthys laurae*, new genus and species: Holotype (U.S.N.M. No. 120999), 14 mm. in standard length. Drawn by Mrs. Aime M. Awl.

Description.—Certain detailed measurements and counts were made on the holotype and these data are recorded in table 14.

In addition to the characters recorded in the generic description, in the key, and in the table, the following is given: Eye about 1.2 or 1.3 in the flat interorbital space; head 3, depth 3.5, in standard length; pectoral fins not quite reaching to opposite anal origin but past middle of pelvics, the tips of latter extending a trifle past anal origin; caudal, anal, and pectoral fins with posterior margins rounded; the second ray of pelvic is longest; caudal fin scaled about one-third to two-fifths out from its base.

Coloration.—General color in alcohol brownish, with a darker band along midsides, somewhat broken by pale centers of scales; anal with a black spot near middle of fin on posterior rays.

Remarks.—This new species may be distinguished from all other related forms of cyprinodont fishes by means of the key. It differs in regard to free margin of eye, forward slant of anterior edge of preorbital, crowded scales on breast, origin of dorsal in front of that of anal, and in coloration.

Named *laurae*, in honor of Laura Clark Hubbs (Mrs. Carl L. Hubbs).

TABLE 14.—*Counts and measurements made on* Hubbsichthys laurae

[All measurements expressed in hundredths of the standard length]

Characters	U.S.N.M. No. 120999 Holotype
Standard length in millimeters	14.0
Length of head	33.6
Postorbital length of head	13.6
Greatest depth of body	30.0
Length of snout	8.57
Diameter of eye	12.1
Interorbital space at middle of orbits	15.7
Length of caudal peduncle	33.6
Least depth of caudal peduncle	15.7
Greatest width of head	20.7
Distance from snout to dorsal origin	52.8
Snout to anal origin	57.2
Snout to pectoral insertion	32.9
Snout to pelvic insertion	47.2
Length of longest ray of dorsal fin	12.1
Length of longest ray of anal fin	15.7
Length of longest ray of pectoral fin	20.7
Length of longest ray of pelvic fin	11.4
Length of longest ray of caudal fin	25.0
Length of depressed dorsal fin	30.0
Length of depressed anal fin	21.4
Length of base of dorsal fin	24.3
Length of base of anal fin	8.57
Scales from head to midcaudal fin base	32
Scales from dorsal origin to anal origin	8
Scales in a zigzag row around caudal peduncle	14
Scales in front of dorsal plus enlarged ones on head	9+3 or 4
Dorsal rays	i, 12
Anal rays	iii, 7
Pectoral rays	15–15
Pelvic rays	7–7

Family POECILIIDAE

As Dr. Carl L. Hubbs, of the Scripps Institution of Oceanography had begun work on the Poeciliidae of Venezuela collected by Dr. F. F. Bond, he wished to work up the national collections of this family. Since his studies are still in progress I have omitted this material, along with some collected by me in Venezuela.

Genus POECILIA Bloch and Schneider

Poecilia BLOCH AND SCHNEIDER, Systema ichthyologiae, p. 452, 1801. (Genotype, *Poecilia vivipara* Bloch and Schneider.)

POECILIA VIVIPARA Bloch and Schneider

Poecilia vivpara BLOCH AND SCHNEIDER, Systema ichthyologiae, p. 452, 1801 (Surinam).—ERNST, Estudios sobre la flora y fauna de Venezuela, p. 282, 1877 (creeks near Caracas).—REGAN, Proc. Zool. Soc. London, 1913, p. 1006, fig. 173c (Venezuela and Leeward Islands to Río La Plata).—DE BEAUFORT, Studies on the fauna of Curaçao, Aruba, Bonaire, and the Venezuelan Islands, vol. 2, p. 111, 1940 (Peninsula de Paraguana, Estanque de Moruy, Estanque de Santa Fé, Estanque de Santa Ana, Venezuela).

The following collection was lent by Dr. William Beebe:

20 specimens, 17 to 27 mm., from Caripito, 1942.

Genus LEBISTES Filippi

Lebistes Filippi, Arch. Zool. Anat. Fisiol., vol. 1, p. 69, 1861. (Genotype, *Poecilia reticulata* Peters.)

LEBISTES RETICULATUS (Peters)

Poecilia reticulata Peters, Monatsb. Akad. Wiss. Berlin, 1859, p. 412 1860 (Caracas in Río Guaire).—Garman, Mem. Mus. Comp. Zool., vol. 19, No. 1, p. 62, 1895 (Venezuela).

Girardinus reticulatus Günther, Catalogue of the fishes in the British Museum, vol. 6, p. 353, 1866 (Caracas, Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 65, 1891 (Caracas).

Girardinus guppyi Günther, Catalogue of the fishes in the British Museum, vol. 6, p. 353, 1866 (Venezuela).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 65, 1891 (Venezuela).

Lebistes reticulatus Regan, Proc. Zool. Soc. London, 1913, p. 1008, fig. 173 D, (Venezuela).—Eigenmann, Indiana Univ. Studies, vol. 7, No. 44, p. 13, 1920 (Maracay; Río Castaño; Isla del Buro; Río Bue; all Lake Valencia basin).—Pearse, Univ. Wisconsin Studies, No. 1, p. 22, 1920 (Lake Valencia at Maracay and Isla del Buro).—de Beaufort, Studies on the fauna of Curaçao, Aruba, Bonaire, and the Venezuelan Islands, vol. 2, p. 111, 1940 (Margarita Island).

U.S.N.M. No. 121689, 290 specimens, Río Valle, south of Caracas, Venezuela, L. P. Schultz, G. Zuloaga, William Phelps, Jr., and R. Sherman, May 12, 1942.

Two specimens, 15.5 and 18.5 mm., William Beebe, Caripito, 1942.

Genus MOLLIENISIA LeSueur

Mollienisia LeSueur, Journ. Acad. Nat. Sci. Philadelphia, vol. 2, p. 3, 1821. (Genotype, *Mollienisia latipinna* LeSueur.)

Allopoecilia Hubbs, Misc. Publ. Mus. Zool. Univ. Michigan, No. 13, pp. 11, 13, pl. 4, fig. 6 (gonopodium), 1924. (Genotype, *Girardinus caucanus* Steindachner.)

MOLLIENISIA CAUCANA (Steindachner)

Giradinus caucanus Steindachner, Denkschr. Akad. Wiss. Wien, vol. 42, p. 87, pl. 6, figs. 4, 5, 1880 (Río Cauca).

Allopoecilia caucana Myers, Copeia, 1932, No. 3, p. 138 (? Maracaibo Basin).

Mollienisia caucana Gabaldon (in part), Journ. Parasit., vol. 21, No. 4, pp. 311–312, 1935 (Pampán, Trujillo, Venezuela).

U.S.N.M. No. 121677, 33 specimens, 19 to 33 mm., from Río Motatán, 4 km. above Motatán, March 25, 1942.

U.S.N.M. No. 121681, 34 specimens, 11 to 26 mm., Río Motatán, 8 km. below Motatán, March 24, 1942.

U.S.N.M. No. 121679, 33 specimens, 14 to 28 mm., Río San Pedro at bridge, Motatán system, March 20, 1942.

U.S.N.M. No. 121686, 169 specimens, 8 to 32.5 mm., Río San Juan near bridge, Motatán system, March 17 and 20, 1942.

U.S.N.M. No. 121682, 11 specimens, 11.5 to 25.5 mm., Río Jimelles, 12 km. east of Motatán, Motatán system, March 24, 1942.

U.S.N.M. No. 121685, 191 specimens, 12 to 35 mm., Río Chama at Estanques, Estado de Mérida, April 3, 1942.

U.S.N.M. No. 121680, 16 specimens, 13 to 29 mm., Río Barregas, tributary Río Chama just below Egido, Estado de Mérida, March 29, 1942.

U.S.N.M. No. 121678, 5 specimens, 17 to 33 mm., Río Chama, 10 km. below Lagunillas, Estado de Mérida, March 30, 1942.

U.S.N.M. No. 121676, 1 specimen, Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6, 1942.

U.S.N.M. No. 109112, 2 specimens, Pampán, Estado de Trujillo, Venezuela, Dr. Arnoldo Gabaldon, April 18, 1935. One specimen from this lot is the holotype of *Hubbsichthys laurae* herein described.

U.S.N.M. No. 86264, 4 specimens, 28 to 43 mm., Valera, Estado de Trujillo, Venezuela, H. Pittier, 1923.

U.S.N.M. No. 86263, 2 specimens, 23 and 24 mm., Valera, Estado de Trujillo, Venezuela, H. Pittier, 1923.

MOLLIENISIA SPHENOPS VANDEPOLLI (Van Lidth de Jeude)

Poecilia vandepolli Van Lidth de Jeude, Notes Leyden Mus., vol. 9, p. 137, 1887 (ref. copied).

Mollienesia sphenops Regan, Proc. Zool. Soc. London, 1913, p. 1012, fig. 173 F (Venezuela).—Meek and Hildebrand, Publ. Field Columbian Mus. (Zool.), vol. 10, No. 15, p. 327, fig. 10, 1916 (Venezuela).

U.S.N.M. No. 121687, 27 specimens, brackish caño at Los Monitos, Río Limón system, March 11, 1942.

U.S.N.M. No. 121688, 10 specimens, Lago de Maracaibo at Yacht Club, Maracaibo, February 27, 1942.

U.S.N.M. No. 121690, 1,328 specimens, 9 to 70 mm., Salina Santa Rosa, 3 km. north of Maracaibo, specific gravity 1.029, temperature 98° F., February 20, 1942.

Order BERYCOIDEA

Family HOLOCENTHRIDAE: Squirrelfishes

Genus HOLOCENTRUS Scopoli

Holocenthrus Scopoli, Introductio historiam naturalem, p. 499, 1777. (Misprint for *Holocentrus* after Gronow's *Holocentrus maxilla*.)

HOLOCENTRUS ASCENSIONIS (Osbeck)

Squirrelfish, Matejuelo, Candil o Carajuelo

Perca ascensionis Osbeck, Reise nach Ostindien und China, p. 388, 1765 (ref. copied) (Ascension Island).

Holocentrus ascensionis Röhl, Fauna descriptiva de Venezuela, p. 393, fig. 202, 1942 (coast of Venezuela).

Order SOLENICHTHYOIDEA

Family FISTULARIIDAE: Trumpetfishes or Cornetfishes

Genus FISTULARIA Linnaeus

Fistularia Linnaeus, Systema naturae, ed. 10, p. 312, 1758. (Genotype, *Fistularia tabacaria* Linnaeus.)

FISTULARIA TABACARIA Linnaeus

TRUMPETFISH; TROMPETERO O CORNETA

Fistularia tabacaria LINNEAUS, Systema naturae, ed. 10, p. 312, 1758.—RÖHL, Fauna descriptiva de Venezuela, p. 389, fig. 198, 1942 (coast of Venezuela).

Family SYNGNATHIDAE: Pipefishes; Seahorses

Earl S. Herald (1942) has prepared a key to the pipefishes of the western Atlantic which includes all the known American species. I have prepared the following key for the identification of the pipefishes reported from Venezuela, but as more collecting is done several additional species should be taken:

1*a*. Tail prehensile, usually more or less in a curled condition; caudal fin absent; head at nearly right angles to body (*Hippoccampus*).[16]

1*b*. Tail not prehensile; caudal fin present; head not at right angles to body but in same general axis.

2*a*. The keel along the middle of the side of the trunk turns downward over the anus and without interruption continues posteriorly as the lower lateral keel on the tail region; dorsal and anal fins present; dorsal fin rays 38 to 44; rings on body about 19 or 20+23 to 27; pectoral fin rays about 19 or 20; dorsal origin in second or third ring in front of ring containing anal fin base.....**Oostethus lineatus** (Kaup)

2*b*. The medial keel along side of the trunk not continuous with the lower lateral keel on tail.

3*a*. Keel along middle of side of trunk turned upward over anus and without interruption continuing posteriorly as upper lateral keel on tail region; dorsal fin present; anal fin absent; dorsal fin rays usually 35 to 37; rings on body 14+35 to 38; pectoral fin rays 13 or 14; dorsal origin usually in body ring that contains anus.

Pseudophallus mindii (Meek and Hildebrand)

3*b*. Keel along middle of side of trunk interrupted or discontinuous over anal region, then beginning in same body ring but continuing as upper lateral keel on tail region; dorsal and anal fins present.

4*a*. Tail rings 30 to 38; brood pouch covering 11 to 20 tail rings; rings on body 16 to 18+30 to 35; dorsal rays 27 to 33; pectoral fin rays 13 or 14; dorsal origin usually in first trunk ring in front of the one that contains anus.

5*a*. Adult females flat-bellied and without vertical pale body stripes on middle of trunk rings.....**Syngnathus rousseau** Kaup

5*b*. Adult females V-bellied and with vertical pale stripe in center of each trunk ring, striping usually present upon tail.

Syngnathus pelagicus Linnaeus

4*b*. Tail rings 39 to 43; brood pouch covering 22 to 25 tail rings.

Syngnathus fistulatus Peters

Genus OOSTETHUS Hubbs

Oostethus HUBBS, Occ. Papers Mus. Zool. Univ. Michigan, No. 199, p. 3, 1929. (Genotype, *Doryichthys lineatus* Kaup.)

[16] *Hippocampus punctulatus* is recorded by Röhl (1942) from the coast of Venezuela but even with the aid of Ginsburg's review of the genus (Proc. U. S. Nat. Mus., vol. 83, pp. 497–594, figs. 54–71, 1937) I do not know what species he actually had. The common name in Venezuela is caballito de mar.

In 1943 (U. S. Nat. Mus. Bull. 180, p. 73) I included this genus in the synonymy of *Doryichthys* Kaup but upon further consideration I am inclined to recognize it as a distinct genus.

OOSTETHUS LINEATUS (Kaup)

Doryichthys lineatus Kaup, Catalogue of the lophobranchiate fish in the collection of the British Museum, p. 59, 1856 ("Bahía, Mexico and Guadaloupe").

3 specimens, 139 to 159 mm., Río Sanchón, 5 km. west of Tavorda, F. F. Bond, January 26, 1938.

5 specimens, 104 to 165 mm., from Río Cumboto, near mouth, 2 km. northwest of Ocumare, F. F. Bond, May 5, 1939.

1 specimen, 112 mm., from Río Cumboto, near Ocumare, F. F. Bond, January 5, 1938.

Genus PSEUDOPHALLUS Herald

Pseudophallus Herald, Allan Hancock Pacific Expedition, vol. 9, No. 3, p. 51, 1940. (Genotype, *Siphostoma starksi* Jordan and Culver.)

PSEUDOPHALLUS MINDII (Meek and Hildebrand)

Syngnathus mindii Meek and Hildebrand, The marine fishes of Panama, vol. 1, p. 261, pl. 18, fig. 2, 1923 (creek near Mindi, Canal Zone).

1 specimen, 95 mm., standard length, from Río Sanchón, 5 km. west of Tavorda, F. F. Bond, January 26, 1938.

2 specimens, 112 and 113.5 mm., from Río Cumboto, near mouth, 2 km. northwest of Ocumare, F. F. Bond, May 5, 1939.

1 specimen, 100 mm. but with regenerated caudal region, Río Cumboto, near Ocumare, F. F. Bond, January 5, 1938.

The following counts were made on the above listed specimens: Dorsal fin rays 37 in three counts, 39 in one; pectoral rays 13 in one and 14 in three counts; body rings on trunk 14 in all four specimens, and tail rings 35 in two, 36 in one, and only 28 body rings left in the injured specimen; caudal fin had 10 rays in one count.

The coloration consists of dark brown upper side, sharply contrasting with a pale grayish band along the dorsal side from snout to tail; ventral side pale; caudal fin bordered with pale; dark brown streak from lower jaw through eye to pectoral fin base; actual tip of lower jaw pale and forming part of pale band on dorsal surface of head.

Genus SYNGNATHUS Linnaeus

Syngnathus Linnaeus, Systema naturae, ed. 10, p. 336, 1758. (Genotype, *Syngnathus acus* Linnaeus.)

SYNGNATHUS ROSSEAU Kaup

Syngnathus rosseau Kaup, Catalogue of lophobranchiate fish in the collection of the British Museum, p. 40, 1856 (Martinique).—Herald, Stanford Ichthyol. Bull., vol. 2, No. 4, pp. 130, 133, 1942 (Venezuela).

U.S.N.M. No. 123162, 4 specimens, 114 to 147 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

U.S.N.M. No. 123163, 1 specimen, 102 mm., Cape San Román, U. S. S. *Niagara*, April 2, 1925.

SYNGNATHUS PELAGICUS Linnaeus

Syngnathus pelagicus LINNAEUS, Systema naturae, ed. 10, p. 337, 1758.

U.S.N.M. No. 123164, 1 specimen, 183 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

SYNGNATHUS FISTULATUS Peters

Syngnathus fistulatus PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 456 (Puerto Cabello [undoubtedly Venezuela]).

Order PERCOMORPHOIDEA

Suborder PERCESOCES

Family ATHERINIDAE: Silversides; Pescados del rey, o Pejerreres

This family of world-wide distribution has only four species so far known from Venezuelan waters. They may be distinguished by means of the following key:

1*a*. Four glandlike depressions on dorsal surface of snout; anus far forward, equidistant or nearer pelvic bases than anal fin origin; air bladder and body cavity not reaching anywhere near to opposite anal fin origin; first dorsal origin notably in front of anal origin; scaly sheath along base of anal fin consisting of a few scales anteriorly; margins of scales with entire edges; ascending premaxillary process a narrow spinelike projection; dorsal rays IV or V—I, i, 7 or I, i, 8; anal rays I, i, 14; scales about 44.
Adenops analis Schultz

1*b*. No glandlike depressions on dorsal surface of snout as in *Adenops*; anus just in front of anal origin or much closer to anal origin than to pelvic bases; ascending premaxillary process a wide-based triangular projection; margins of scales entire.

2*a*. Posterior end of body cavity extending to anal origin or well past anal fin origin; belly rounded; no sheath of scales along anal fin base; first dorsal origin over or nearly over anal origin, sometimes over base of first branched anal ray; dorsal rays III or IV—I, i, 5 to I, i, 7; anal rays I, i, 14 to I, i, 19.

3*a*. Scale rows from upper angle of gill opening to midbase of caudal fin 38 to 40 ..... **Xenomelaniris brasiliensis** (Quoy and Gaimard)

3*b*. Scale rows 41 or 42 ..... **Xenomelaniris venezuelae** (Eigenmann)

2*b*. Posterior end of body cavity notably not reaching anal fin origin; belly compressed; anal fin base with a wide scaly sheath composed of two rows of scales along its entire length; first dorsal origin over bases of fourth or fifth branched rays of anal fin; maxillary reaching to below front part of eye; dorsal rays III—I, i, 7 or I, i, 8; anal rays I, i, 21 to I, i, 23; scales 44 to 48 ..... **Coleotropis blackburni**, new species.

Genus ADENOPS Schultz

Adenops SCHULTZ, Proc. U. S. Nat. Mus., vol. 98, p. 34, 1948. (Genotype, *Adenops analis* Schultz.)

This genus has the premaxillary dilated posteriorly; premaxillary or gape of mouth a little concave at side; rictus restricted by a

TABLE 15.—*Counts recorded for certain species of Atherinidae*

Species	Number of fin rays																												
	Dorsal							Anal																					
	First			Second																									
	III	IV	V	I, i, 5	I, i, 6	I, i, 7	I, i, 8	I, i, 12	I, i, 13	I, i, 14	I, i, 15	I, i, 16	I, i, 17	I, i, 18	I, i, 19	I, i, 20	I, i, 21	I, i, 22	I, i, 23	I, i, 24	I, i, 25	I, i, 26	I, i, 27	I, i, 28
Xenomelaniris:																													
venezuelae		5			2	3						1	2	2															
brasiliensis	10	12		3	9	10				1	2	10	8	2	2		1												
Adenops:																													
analis		11	3			12	2	1	4	11																			
Coleotropis:																													
starksi	2	2				4															1		2	1					
blackburni	7					6	1										2	4	1										

Species	Number of fin rays					Number of scales											Number of gill rakers on lower limb of first arch					
	Pectoral																					
	i, 10	i, 11	i, 12	i, 13	i, 14	38	39	40	41	42	43	44	45	46	47	48	13	14	15	16	17	18
Xenomelaniris:																						
venezuelae				3					3	2										2	2	1
brasiliensis			1	7	2	5	7	8									2	1	4	2	1	
Adenops:																						
analis		1	6	2						2	4	6	2				1	1	3			
Coleotropis:																						
starksi			2						2	2									1	1		
blackburni			4	1								1	1		2	2				2	1	

membrane folding between jaws; dentigerous surface of premaxillaries not reflected outward and covering face of that bone with "shagreen"; two dorsal fins present; silvery lateral band present; mouth small, the maxillary not reaching to eye; air bladder and body cavity not reaching anywhere near to opposite anal fin origin; first dorsal origin notably in front of anal origin; pelvic insertions much closer to opercular margin or upper angle of pectoral fin base than to anal origin; about 5 or 6 scales forming a sheath anteriorly along base of anal fin; margin of scales entire; distal margins of dorsal and anal fins concave; ascending process of premaxillary a narrow based spine-like projection; vertebrae in one count 16 + 24.

It differs from all other genera of Atherinidae by having the anus far forward, equidistant between pelvic insertion and anal origin or nearer pelvic base than anal origin in combination with the four glandlike depressions on dorsal surface of snout and the body cavity nowhere near reaching to opposite the anal fin origin.

The only other related atherine fishes with the posterior end of the premaxillary dilated that have the anus far forward is *Archomenidia sallei* (Regan), but that genus has the air bladder and body cavity conspicuously extending some distance past the anal fin origin.

The only related genus of atherine fish with the four glandlike depressions on the dorsal surface of the snout is *Membras*, but that differs from *Adenops* in having the anus just in front of the anal-fin origin.

ADENOPS ANALIS Schultz

FIGURE 14

Adenops analis SCHULTZ, Proc. U. S. Nat. Mus., vol. 98, p. 34, 1948 (type locality, Lago de Maracaibo.)

Holotype.—U.S.N.M. No. 121824, a specimen, 59 mm. in standard length, collected by Leonard P. Schultz at night by flashlight in Lago de Maracaibo, 1 km. off Pueblo Viejo, Venezuela, on April 7–8, 1942.

Paratypes.—U.S.N.M. No. 121823, 66 specimens, 9 to 53.5 mm. in standard length, taken along with the holotype and bearing same data. There appear to be at least two age groups in this lot with 25 specimens 9 to 17.5 mm. and 41 fishes 19.5 to 53.5 mm.

Description.—Detailed measurements were made on the holotype and two paratypes, and these data, expressed in hundredths of the standard length, are recorded in table 16.

Greatest depth of body about 5.5 to 5.75, head 4.5 to 4⅔, both in standard length; snout 3.5 to 3.75, orbit 3⅓ to 3.5, interorbital 3 to 3⅓, all in length of head; premaxillary a little curved, causing gape of mouth to be somewhat concave; mouth rather small, the maxillary not reaching to front of orbit; gill rakers slender, the longest about

⅔ diameter of pupil; rear margin of pupil about in middle of length of head; pelvic fin insertions a little closer to upper angle of pectoral fin base than to anal origin; anal origin equidistant between midbase of caudal fin and the second third of length of opercle; first dorsal origin conspicuously a little in front of a line through anal origin; second dorsal origin about over base of sixth from last anal fin ray; pelvic fins short usually reaching a trifle over halfway to anal origin; the anus is located nearly equidistant between anal origin and pelvic bases, but much closer to pelvic bases in the smaller ones; the body cavity extends only a trifle past anal opening; the ascending premaxillary processes are long, slender, with narrow bases, not triangular in shape; pectoral fins pointed, reaching a short distance past pelvic bases; interorbital space a little convex, belly rounded; posterior margins of scales entire; silvery lateral band present, wider than pupil anteriorly, but constricted a little on caudal peduncle where it is not quite as wide as pupil; least depth of caudal peduncle 2⅕ to 2⅖ in its length; lower jaw a little shorter than upper, slightly included; teeth minute in both jaws in a narrow villiform band.

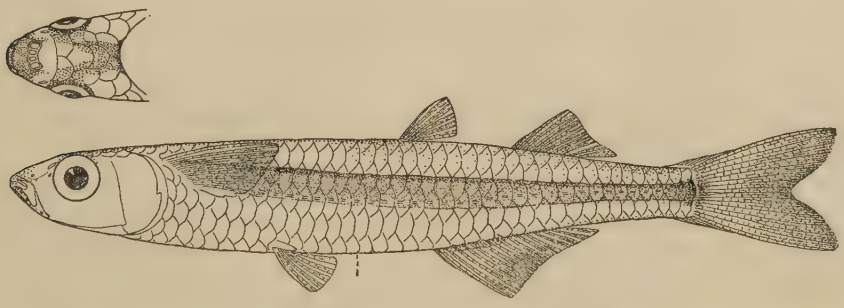

FIGURE 14.—*Adenops analis* Schultz: Holotype (U.S.N.M. No. 121824), 59 mm. in standard length. Drawn by Mrs. Aime M. Awl.

The following counts were made, respectively: Dorsal rays, IV–I, i, 8; V–I, i, 7; and IV–I, i, 7. Anal rays I, i, 14; I, i, 14; and I, i, 14. Pelvics always I, 5. Pectoral rays, i, 12–i,12; and i, 12. Branched caudal rays 15; 15; 15. Scales above lateral line to first dorsal origin 3½; 3½; 3½; and below lateral line to anal origin 2½; 2½; and 2½. Scales in the lateral line 44; 44; 44. Scales in front of first dorsal to rear of pigmented area over brain 20; 21; 20. Scales between anal origin and anus 4; 4; 4. Scales between dorsal bases of dorsal fins 7; 7; 6. Zigzag scales around least depth of caudal peduncle 12; 12; and 12. Gill rakers on first gill arch 4 + 1 + 14; —; and 2 + 1 + 13. Additional counts will be found in table 16.

Coloration.—In alcohol, straw-colored with silvery lateral band, bordered above by a narrow dark streak, wider anteriorly; middorsal line with a prominent row of black pigment spots or cells; each scale

TABLE 16.—*Measurements, expressed in hundredths of the standard length, for certain species of Atherinidae*

Characters	*Coleotropis blackburni*		*Coleotropis starksi*	*Xenomelaniris brasiliensis*		*Adenops analis*			*Xenomelaniris venezuelae*	
	Holotype	Paratype	Holotype			Holotype	Paratype	Paratype		
Standard length in millimeters	82.0	45.0	108.5	68.0	102.5	59.0	45.5	34.8	33.0	31.7
Length of head	22.1	22.2	24.0	23.5	21.8	22.0	21.5	22.4	27.3	28.1
Greatest depth of body	21.2	18.9	23.0	16.9	17.4	15.9	18.2	17.2	17.4	17.3
Length of snout	6.95	6.66	7.74	7.21	7.31	7.29	6.16	6.90	8.48	7.88
Diameter of orbit	5.85	6.89	7.56	7.65	5.85	6.61	6.16	7.46	9.08	9.78
Postorbital length of head	10.0	9.56	9.30	10.6	10.0	10.0	9.67	9.48	11.2	10.4
Width of bony interorbital space	6.95	7.56	7.46	7.50	7.50	7.46	7.25	8.33	6.60	7.25
Length of caudal peduncle	20.6	20.7	16.7	19.6	22.4	20.3	21.1	22.4	18.8	19.6
Least depth of caudal peduncle	9.88	9.56	8.66	8.83	8.10	7.96	8.79	9.48	9.08	8.50
Greatest width of head	11.3	9.78	11.5	12.4	12.0	10.9	10.6	9.48	11.2	12.9
Distance from:										
Pelvic insertion to anal origin	15.5	17.3	17.3	21.6	21.0	22.7	22.6	22.4	18.8	18.0
Snout tip to first dorsal origin	57.8	58.0	60.0	57.4	58.5	57.6	56.9	56.6	57.0	59.0
Snout tip to second dorsal origin	72.4	70.2	74.6	72.0	71.6	73.6	72.0	73.0	73.9	73.8
Snout tip to anal origin	52.0	53.2	55.6	61.8	59.0	62.7	59.1	61.7	58.8	59.9
Snout tip to pectoral insertion	21.8	22.9	24.7	24.1	22.4	22.5	21.8	23.3	26.7	27.7
Snout tip to pelvic insertion	37.1	36.0	40.1	42.7	38.1	40.3	37.6	40.8	40.9	42.0
First dorsal to second dorsal origin	15.2	12.9	15.0	14.4	13.1	16.3	16.0	17.2	16.4	13.6
Anal origin to center of anus	4.50	4.45	3.87	3.85	2.63	9.66	10.5	10.6	4.54	3.78
Length of longest ray of:										
First dorsal fin	5.85	5.34	4.60	6.62	6.34	8.64	6.59	7.18	7.57	6.94
Second dorsal fin	----	11.3	11.8	12.2	----	9.15	10.3	10.3	11.5	7.88
Anal fin	14.0	15.1	13.3	15.7	13.6	12.2	11.6	12.4	16.4	----
Pectoral fin	18.3	----	21.5	20.0	20.5	----	16.0	16.4	20.3	23.0
Pelvic fin	10.2	10.0	10.4	13.2	11.8	10.9	10.5	10.3	13.6	12.6
Length of next to last ray of second dorsal	----	----	----	----	----	4.58	4.62	4.31	----	----
Length of last dorsal ray	6.70	6.66	5.53	6.18	5.56	6.95	6.59	5.17	----	----
Length of depressed second dorsal fin	15.4	16.7	13.8	14.4	13.4	15.4	15.4	15.8	15.1	14.2
Length of depressed anal fin	33.8	31.3	35.9	27.8	25.1	25.1	24.4	24.1	26.7	26.8
Length of base of second dorsal fin	9.14	10.0	8.11	8.09	7.80	9.49	9.23	8.62	7.57	7.88
Length of base of anal fin	28.1	27.1	29.9	21.2	19.9	18.8	20.0	18.7	23.0	23.0
Length of accessory pelvic scale	3.90	4.21	3.68	4.12	4.20	----	----	----	3.36	----

of back above silvery lateral band with a black spot, some scales with two of these small pigment spots, thus making 2 rows of spots each side of middorsal line; tip of snout with black pigment; a few black pigment cells on sides of lower jaw and a few near its tip.

Genus XENOMELANIRIS Schultz

Xenomelaniris Schultz, Proc. U. S. Nat. Mus., vol. 98, p. 33, 1948. (Genotype, *Atherina brasiliensis* Quoy and Gaimard.)

XENOMELANIRIS BRASILIENSIS (Quoy and Gaimard)

Silversides; Pejerrey de mar

Atherina brasiliensis Quoy and Gaimard, Voyage autour du monde . . . "L'Uranie" et "La Physicienne," Poissons, p. 332, 1824 (ref. copied).

Thrina brasiliensis Jordan and Hubbs, A monographic review of the family of Atherinidae or silversides, p. 59, 1919 (Lago de Maracaibo).—Hubbs, Occ. Pap. Mus. Zool. Univ. Michigan, No. 88, p. 3, 1920 (salt and brackish waters from Lago de Maracaibo to Río de Janeiro, Brazil).

U.S.N.M. No. 121822, 1 specimen, 100 mm., Maracaibo Yacht Club, Maracaibo, March 5, 1942.

U.S.N.M. No. 121821, 2 specimens, one 68 mm., the other with broken caudal peduncle, Maracaibo Yacht Club, Maracaibo, February 27, 1942.

U.S.N.M. No. 123204, 10 specimens, 245 to 48.5 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

Three specimens, 15 to 50 mm. in standard length, Laguna del Río Capatárida at mouth, 5 km. north of Capatárida, F. F. Bond, March 21, 1938.

I have made counts and measurements on the above-listed material and have compared these with similar counts made on specimens from Trinidad and Brazil. Because of a large variation and a small series of specimens it is not possible to separate the Lago de Maracaibo population from that of the Gulf of Venezuela or of Brazil. Perhaps when an adequate number of specimens has been studied throughout the range of this species, it may be possible to break it up into subspecies.

XENOMELANIRIS VENEZUELAE (Eigenmann)

Pejerrey de Agua Dulce

Menidia venezuelae Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 12, 1920 (Río Tapa Tapa, Lago de Valencia Basin, Venezuela).

I have had for examination five small specimens, 25.5 to 33.5 mm. in standard length, collected by Dr. F. F. Bond at La Boca, Lago de Valencia, June 20, 1938.

Measurements and counts were made on the above-mentioned lot, and these data are recorded in tables 15 and 16, respectively.

Genus COLEOTROPIS Myers and Wade

Coleotropis Myers and Wade, Allan Hancock Pacific Expedition, vol. 9, No. 5, p. 136, 1942. (Genotype, *Menidia starksi* Meek and Hildebrand.)

COLEOTROPIS BLACKBURNI, new species

PEJERREY DE MAR

FIGURE 15

Holotype.—U.S.N.M. No. 123205, a specimen 82 mm. in standard length, collected in the Gulf of Venezuela at Jacuque Point, by the U. S. S. *Niagara* on January 26, 1925.

Paratypes.—U.S.N.M. No. 123207, 4 specimens 45 to 65 mm. in standard length, collected in the Gulf of Venezuela at Point Macolla, by the U. S. S. *Niagara*, April 19, 1925; U.S.N.M. No. 123206, 2 specimens, 36 to 37.5 mm., collected in the Gulf of Venezuela by the U. S. S. *Niagara*, April 4, 1925.

Description.—Detailed measurements were made on the holotype and one paratype, and these data, expressed in hundredths of the standard length, are recorded in table 16.

Greatest depth of body 4.8 to 5.25, head 4.5 to 4.75, both in standard length; snout 3.25 to 3.5, orbit 2.8 to 3.5, interorbital 2.8 to 3, all in length of head; premaxillary a little curved, causing gape of mouth to be somewhat concave; mouth of moderate size, the posterior tip of maxillary reaching to under front margin of orbit; gill rakers rather slender, the longest about equal to diameter of pupil; rear margin of pupil at or very slightly in advance of midlength of head; pelvic fin insertions about equal distance between anal origin and upper angle of pectoral fin base; anal fin origin equidistant between midbase of caudal fin and near middle of length of snout; first dorsal origin conspicuously behind a vertical line through anal origin, about over base of second branched anal ray; second dorsal origin over beginning of last third of length of anal fin base; pelvic fins reaching from one-half to two-thirds the way to anal origin but not quite to anus; anus is located a very short distance in front of anal origin but much closer to anal origin than to base of pelvics; the body cavity and air bladder notably do not extend posteriorly to opposite the anal fin origin; the ascending premaxillary process is broadbased, and triangular in shape; pectoral fins pointed reaching about halfway out length of pelvics; interorbital space slightly convex; belly somewhat compressed, not fully rounded; posterior margins of scales entire, not crenulate; silvery lateral band much wider than pupil anteriorly, then partially constricted on caudal peduncle and narrower than pupil, thence a little wider before ending at base of caudal fin; least depth of caudal peduncle not quite twice in its length; lower jaw a littler shorter than upper, and a little included; teeth small, in upper jaw in two rows, these separated by a narrow nondentigerous space, those in lower jaw in two rows anteriorly, becoming one row on sides; the posterior end of dentary scarcely elevated; a scaly sheath along base of anal fin, two scales wide anteriorly.

The following counts were made, respectively, for holotype and paratype: Dorsal rays III–I, i, 7 and III–I, i, 7. Anal rays I, i, 22 and I, i, 22. Pectoral rays i, 12–i, 13 and i, 12–i, 12. Pelvics always I, 5 and branched caudal fin rays always 15. Scales from first dorsal origin to lateral line 5 and 5 and from lateral line to anal origin 4 and 4. Scale rows from head to midbase of caudal fin 45 and 48. Scales from first dorsal origin to pigmented area over brain 22 and 23. One or two scales between anal origin and anus. Scales between bases of dorsal fins 7 and 7. Zigzag scales around least depth of caudal peduncle 16 and 16. Gill rakers on first gill arch 3 + 1 + 15 and 3 + 1 + 15. Vertebral count for one of the paratypes 14 + 27.

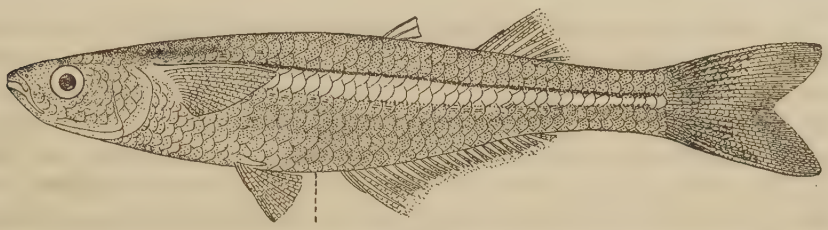

FIGURE 15.—*Coleotropis blackburni*, new species: Holotype (U.S.N.M. No. 123205), 82 mm. in standard length. Drawn by Mrs. Aime M. Awl.

Coloration.—In alcohol, plain except for silvery lateral band which has a blackish dorsal border; a few dark pigment cells still visible on posterior border of scales that occur above silvery lateral band.

Remarks.—This new species is related to *Coleotropis starksi* (Meek and Hildebrand) from the Pacific side of Panama but differs from that species by having I, i, 21 to I, i, 23 anal rays instead of I, i, 25 to I, i, 28. In addition *C. blackburni* has 44 to 48 scales instead of 41 to 42 as in *C. starksi*.

Named in honor of Capt. P. P. Blackburn, of the U. S. S. *Niagara*, who preserved all the fishes collected in Venezuelan waters in 1924–1925 reported upon in this contribution. It gives me great pleasure to name this interesting species of silverside after Captain Blackburn.

Family SPHYRAENIDAE: Barracudas

Genus SPHYRAENA Walbaum

Sphyraena WALBAUM, Artedi's Bibliotheca ichthyologicae, vol. 3, pp. 94, 584, 1792. (Genotype, *Esox barracuda* Walbaum.)

SPHYRAENA BARRACUDA (Walbaum)

PICUDA

Esox barracuda WALBAUM, Artedi's Bibliotheca ichthyologicae, vol. 3, pp. 94, 584, 1792 (West Indies).

Sphyraena barracuda RÖHL, Fauna descriptiva de Venezuela, p. 392, fig. 201, 1942 (coast of Venezuela).

U. S. N. M. No. 123220, large head, Punta Gorda, east coast of Gulf of Venezuela, U. S. S. *Niagara*, December 18, 1924. This specimen measured 4 feet 6 inches in total length and weighed 33½ pounds.

SPHYRAENA GUACHANCHO Valenciennes

GUAGUANCHO

Sphyraena guachancho VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 252, 1829 (Havana).—METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 41, 1919 (Puerto Cabello, Venezuela).

Family MUGILIDAE: Mullets; Lisas

No careful comparison of European and American mullets has been made; *Mugil cephalus* therefore is usually considered to have a world-wide distribution. However, my preliminary study of specimens of *M. cephalus* from Europe compared with some American ones indicates possible differences. Before any definite conclusion can be reached a large series will have to be studied. I have not found any specimen from Venezuela that could be definitely classified as *cephalus*, and I have serious doubt that *M. cephalus* occurs along the east coast of South America or in the West Indies.

During my study of the mullets of Venezuela I considered it necessary to revise provisionally the genera of Mugilidae, since much confusion exists in regard to genera. The results of this preliminary revision have been published (Schultz, 1946).

KEY TO THE GENERA AND SPECIES OF MUGILIDAE REPORTED FROM VENEZUELA

1*a*. Upper and lower jaws inside of lips with a wide band of villiform teeth, but no teeth on outer margin of lips, nor is the lower lip directed or folded downward; anterior margin of lower jaw broadly rounded; gill rakers about 17 to 20 on lower part of first gill arch; maxillary reaching past front of orbit and past posterior tip of preorbital bone; lower lip thick, not thin at edge and not bearing teeth; no adipose eyelid; nostrils much closer together than anterior is from edge of snout, lip excluded; anal rays III, 9; scales about 38 to 41 ..... **Agonostomus monticola** (Bancroft)

1*b*. Lower jaw without a wide band of villiform teeth; gill rakers more than 25 on lower part of first gill arch; lower lip with a thin edge directed horizontally forward or nearly so, usually with a uniserial row of slender simple teeth more or less ciliform, sometimes embedded and almost obsolete; upper jaw with or without a narrow band of minute villiform teeth and lip usually with a single row of minute slender teeth; adipose eyelid well developed, reaching to or nearly to pupil except on young 40 mm. in standard length and shorter, in which case the preorbital is narrower than space between nostrils; nostrils wider apart than anterior nostril is from edge of snout, lip excluded; anterior margin of lower jaw triangular in shape; preorbital posteriorly narrower than distance between nostrils and its posterior tip not reaching front of eye; maxillary reaching to rear edge of preorbital but not beyond front of eye (*Mugil*).

2*a*. Anal rays III, 9; dorsal and anal fins heavily scaled.

3*a*. Scales usually 38 to 41 (rarely 37 or 42); accessory scales at base of first dorsal reach from four-fifths to past tip of fourth dorsal spine; least depth of caudal peduncle into distance from tip of first dorsal fin to second dorsal origin 0.54 to 1.1; snout tip to first dorsal origin into distance from first dorsal origin to midbase of caudal fin 0.94 to 1.13; distance from tip of depressed first dorsal to origin of second dorsal fin into snout tip to origin of first dorsal 4.04 to 8.26; depth 3.53 to 4.7 and head 3.06 to 3.92 in standard length.

Mugil curema Valenciennes

3*b*. Scales usually about 45 or 46; accessory scales at base of first dorsal reaching one-third to three-fourths the way to tip of fourth dorsal spine; depth 4.3 to 5.0 and head 3.7 to 4.2 in standard length.

Mugil incilis Hancock

2*b*. Anal rays III, 8.

4*a*. Scales 31 to 34; depth 4.2 to 5.0, head 3.7 to 4.0 in standard length; least depth of caudal peduncle about 1 to 1.1 in distance from tip of depressed first dorsal to origin of second dorsal; distance from tip of snout to origin of first dorsal into distance from origin of first dorsal to midbase of caudal fin about 1.1; anal and dorsal fins scaled anteriorly and basally only on interradial membranes.

Mugil brasiliensis Spix

4*b*. Scales 29 to 32; depth 3.3 to 3.4, head 3.3 to 3.6 in standard length; least depth of caudal peduncle 0.3 to 0.4 in distance from tip of depressed first dorsal to origin of second dorsal; distance from tip of snout to origin of first dorsal into distance from origin of first dorsal to midbase of caudal fin 0.9 to 1.0; anal and dorsal fins heavily scaled.

Mugil trichodon Poey

Genus AGONOSTOMUS Bennett

Agonostomus Bennett, Proc. Committee Sci. Correspond. Zool. Soc. London, No. 14, p. 166, 1832. (Genotype, *Agonostomus telfairii* Bennett, from Mauritius.)

AGONOSTOMUS MONTICOLA (Bancroft)

Lisa de agua dulce, o Dajao

Mugil monticola Bancroft, *in* Griffith's ed. Cuvier's Animal Kingdom, Fishes, p. 367, pl. 36, 1836 (Jamaica) (ref. copied).

U.S.N.M. Nos. 93811–93813, 93818–93819, and 93826, totaling 16 specimens, 61 to 179 mm. in standard length, from a fresh-water stream at Macuto, Venezuela, August 1–2, 1900, collected by Lyon and Robinson.

The following collections were made by Dr. F. F. Bond:

2 specimens, both 61 mm., Río Cumboto, near mouth, 2 km. northwest of Ocumare, May 5, 1939.

3 specimens, 30.5 to 37 mm., Río Guaiguaza, 3 km. west of Puerto Cabello, January 15, 1938.

4 specimens, 28 to 66 mm., Río Cumboto near Ocumare, January 5, 1938.

1 specimen, 51.5 mm., lagoon, 3 km. west of Cumaná on road to Cumanacoa, March 26, 1939.

1 specimen, 73 mm., tributary to Río San Pedrito, 55 km. east of Barcelona, March 25, 1939.

2 specimens, 35 and 36 mm., Río Agua Caliente at Tavorda, 6 km. west of Puerto Cabello, January 15, 1938.

30 specimens, 23 to 106 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

43 specimens, 22 to 43.5 mm., Río Mamo, 15 km. west of La Guaira, November 11, 1938.

In the young of *A. monticola*, the rear end of the maxillary scarcely reaches to the eye at a standard length of 50 mm., but in adults 150 mm. and longer the maxillary reaches well past the front of the orbit, sometimes to under the front of the pupil. I am unable to find any significant differences in any counts made on Venezuelan specimens and other localities in the West Indies and Central America. The origin of the dorsal fin is equidistant between tip of snout or a little closer to tip of snout.

The following counts were made on Venezuelan specimens: Anal rays III, 9 in 14; gill rakers 9 to 12 + 1 + 17 to 20 on first arch in 8 specimens; scales 38 in 1, 39 in 2, and 40 in 6 specimens.

Genus MUGIL Linnaeus

Mugil Linnaeus, Systema naturae, ed. 10, vol. 1, p. 316, 1758. (Genotype, *Mugil cephalus* Linnaeus.)

MUGIL CUREMA Valenciennes

Mullet; Lisa

Mugil curema Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 11, p. 87, 1836 (Brazil, Martinique, Cuba).

?*Mugil cephalus* Röhl, Fauna descriptiva de Venezuela, p. 392, fig. 200, 1942 (Venezuela).

Myxus calancalae de Beaufort, Freshwater fishes from the Leeward Group, Venezuela and eastern Columbia: Studies on the fauna of Curaçao, Aruba, Bonaire, and the Venezuelan Islands, vol. 2, p. 112, pl. Xa, 1940 (Goajira, lower course of the Río Calancala near San Antonio, Colombia).

I have compared De Beaufort's description and figure of his new species in connection with my revision of the genera of Mugilidae and find *calancalae* to be in the querimana stage of development of *Mugil curema*, the commonest mullet along the northern shores of South America.

U.S.N.M. No. 121793, a specimen, 67.5 mm., from Lago de Maracaibo at Yacht Club, in Maracaibo, May 16.

U.S.N.M. No. 121794, 21 specimens, 8 to 61 mm., from Lago de Maracaibo at Yacht Club in Maracaibo, February 27.

U.S.N.M. No. 121792, 126 specimens, 20 to 173 mm., from Caño de Sagua, 25 km. north of Sinamaica, March 12.

U.S.N.M. No. 121797, 1 specimen, 19 mm., Caño de Los Monitos, Río Limón system, north of Maracaibo, March 11.

U.S.N.M. No. 121795, 5 specimens, 147 to 218 mm., from Lago Maracaibo near mouth of Río Concha, May 2.

U.S.N.M. No. 121796, 11 specimens, 74 to 240 mm., from mouth of Caño de Sagua, 25 km. north of Sinamaica, taken March 12, were separated from the other specimens of this species taken at the same place and date, U.S.N.M. No. 121792, because they appear to be more elongate, with a more slender caudal peduncle, and the space from tip of depressed first dorsal to origin of second dorsal is greater. There is too much overlapping, however, to permit the consideration of this lot as a new form.

The following collections were made by the U. S. S. *Niagara* in the Gulf of Venezuela:

U.S.N.M. No. 122969, 5 specimens, 24 to 149 mm., Point Macolla, April 19, 1925.

U.S.N.M. No. 122971, 12 specimens, 39 to 86 mm., Jacuque Point, January 26, 1925.

U.S.N.M. No. 122965, 4 specimens, 37 to 280 mm., Piedras Bay, March 14, 1925.

U.S.N.M. No. 122964, 2 specimens, 48 and 61 mm., Amuay Bay, December 9, 1924.

U.S.N.M. No. 122968, 4 specimens, 33 to 84 mm., south coast of Gulf, November 15, 1925.

U.S.N.M. No. 122970, 18 specimens, 27 to 30 and 143 mm., Salinas Bay, April 4–9, 1925.

U.S.N.M. No. 122967, 1 specimen, 30 mm., Estanques Bay, February 20, 1925.

U.S.N.M. No. 122966, 3 specimens, 16 to 30 mm., Cape San Román, April 2, 1935.

The following collections were made by F. F. Bond:

23 specimens, 19 to 44 mm., Río Cumboto near mouth, 2 km. northwest of Ocumare, May 5, 1939.

9 specimens, 43 to 64 mm., salt-water lagoon on coast, 5 km. west of Cumaná, March 25, 1939.

2 specimens, 94 and 99 mm., Río Cumboto near Ocumare, January 5, 1938.

10 specimens, 25 to 30 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

13 specimens, 39 to 49 mm., Laguna del Río Capatárida, at mouth, 3 km. north of Capatárida, March 21, 1938.

3 specimens, 28 to 47.5 mm. Laguna de Tacarigua, Estado de Miranda, February 3, 1939.

5 specimens, 25.5 to 51 mm., baja seco east side of Puerto Cabello, January 26, 1938.

6 specimens, 28 to 38 mm., "Paparo," Estado de Miranda, February 2, 1939.

The following counts were made: Anal rays III,9 on 32 specimens; scales 38 on 6, 39 on 11, 40 on 9, 41 on 4, and 42 on 1.

MUGIL INCILIS Hancock

Mugil incilis Hancock, Quart. Journ. Sci., 1830, p. 127 (Guiana) (ref. copied).

U. S. N. M. No. 121791, 2 specimens, mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942:

3 specimens, 43 to 44.5 mm., Río Borburata at mouth, 3 km. east of Puerto Cabello, F. F. Bond, January 15, 1938.

The following counts were made: Anal rays III,9 on 5 specimens and scales 45 on 2 and 46 on 2 specimens.

MUGIL BRASILIENSIS Spix

MULLET; LEBRANCHO

Mugil brasiliensis SPIX, *in* Spix and Agassiz, Selecta genera et species piscium . . . Brasiliam . . ., p. 134, pl. 72, pl. F, 1831 (Ocean at Brazil).—RÖHL, Fauna descriptiva de Venezuela, p. 391, 1942 (coast of Venezuela).

Mugil liza VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 11, p. 83, 1836 (Brazil, Surinam, Puerto Rico, Maracaibo, Martinique, Cuba).

U.S.N.M. No. 121788, 6 specimens, 215 to 250 mm., market at Maracaibo, probably caught in El Tablazo, May 15, 1942.

U.S.N.M. No. 121789, 2 specimens, 305 and 310 mm., Salina Rica, north of Maracaibo, March 12, 1942.

U.S.N.M. No. 121786, 3 specimens, 93 to 100 mm., Lago de Maracaibo at Maracaibo Yacht Club, May 16, 1942.

U.S.N.M. No. 121787, 3 specimens, 44 to 115 mm., from Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 122972, 1 specimen, 360 mm. in standard length, Gulf of Venezuela, U. S. S. *Niagara*, February 20, 1925.

The following counts were made: Anal rays III,8 on 15 specimens; scales 31 in 1, 32 in 2, 33 in 7, and 34 in 3 specimens.

MUGIL TRICHODON Poey

LISA

Mugil trichodon POEY, Ann. Lyc. Nat. Hist. New York, vol. 11, p. 66, pl. 8, figs. 4–8, 1875 (Cuba).

U.S.N.M. No. 121970, 9 specimens, 26 to 89 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 122963, 1 specimen, 91 mm., Cape San Román, Gulf of Venezuela, U. S. S. *Niagara*, April 2, 1925.

The following collections were made by F. F. Bond:

10 specimens, 21 to 23 mm., Río Sanchón, 5 km. west of Tavorda, January 26, 1938.

29 specimens, 19 to 22 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

107 specimens, 19 to 27 mm., Río Yaracuy, Boca Yaracuy, 45 km. northwest of Puerto Cabello, January 28, 1938.

29 specimens, 23 to 24 mm., Río Borburata at mouth, 3 km. east of Puerto Cabello at Gañanga, January 15, 1938.

14 specimens, 21.5 to 27 mm., bajo seco east side of Puerto Cabello, January 26, 1938.

1 specimen, 35 mm., Laguna del Río Capatárida, at mouth, 5 km. north of Capatárida, March 21, 1938.

7 specimens, 19 to 26 mm., coastal lagoons, 15 km. north of Maracaibo, April 6, 1938.

The following counts were made: Anal rays III,8 in 9 specimens; scales 29 in 1, 30 in 3, 31 in 3, and 32 in 3 specimens.

Suborder POLYNEMOIDEA

Family POLYNEMIDAE: Threadfins; Barbudos

Genus POLYDACTYLUS Lacepède

Polydactylus LACEPÈDE, Histoire naturelle des poissons, vol. 5, p. 419, 1803. (Genotype, *Polydactylus plumierii* Lacepède=*Polynemus virginicus* Linnaeus.)

POLYDACTYLUS VIRGINICUS (Linnaeus)

BARBUDO

Polynemus virginicus LINNAEUS, Systema naturae, ed. 10, p. 317, 1758 (America).

The following collections were made by the U. S. S. *Niagara* in the Gulf of Venezuela in 1925:

U.S.N.M. No. 123180, 1 specimen, 44 mm. in standard length, from Jacuque Point, January 26.
U.S.N.M. No. 123178, 3 specimens, 45.5 to 47 mm., Piedras Bay, March 14.
U.S.N.M. No. 123179, 7 specimens, 48 to 52 mm., Cape San Román, April 2.
U.S.N.M. No. 123181, 4 specimens, 47 to 49 mm., Gulf of Venezuela, April 4.
U.S.N.M. No. 123182, 12 specimens, 42 to 54 mm., Estanques Bay, February 20.

Suborder PERCOIDEA

Family CENTROPOMIDAE: Robalos

Only two species of *Centropomus* have been collected in Venezuelan waters, although additional forms are to be expected, such as the widely ranging *C. pectinatus* and *C. parallelus*.

Genus CENTROPOMUS Lacepède

Centropomus LACEPÈDE, Histoire naturelle des poissons, vol. 4, p. 248, 1802. (Genotype, *Sciaena undecimalis* Bloch.)

KEY TO THE SPECIES OF CENTROPOMUS FROM VENEZUELA

1*a*. Scales 66 to 72 from supraclavicle serrae to base of caudal fin above lateral line; gill rakers on first gill arch, not counting rudiments, about 3+1+7 or 8 and by counting all rudiments about 6+1+13 or 14; preorbital edge smooth or nearly so; eye 5 to 6.5 in head; second anal spine not quite reaching to opposite base of caudal fin; depth about 4 to 4.8 in standard length; dorsal rays VIII–I, 10; anal III, 6; pectorals ii, 13 or ii, 14; lateral line with a black streak; interspinal membranes of dorsal fin blackish from base to tips, sometimes intensely black distally.

Centropomus undecimalis (Bloch)

1*b*. Scales about 54 to 56 from supraclavicle serrae to base of caudal fin above lateral line; gill rakers on first gill arch, not counting rudiments, about 6+1+11 or 12 and by counting all rudiments 9+1+16 or 17; preorbital edge serrate; eye 4 to 5.5 in head; anal spine very long, usually reaching a little beyond caudal fin base and much longer than length of caudal peduncle; depth about 3.5 in standard length; dorsal rays VIII–I,10; anal III, 6; pectorals ii, 13 or 14; lateral line without black streak; interspinal membranes of dorsal fin blackish from base to tips.....**Centropomus ensiferus** Poey

CENTROPOMUS UNDECIMALIS (Bloch)

ROBALO

Sciaena undecimalis BLOCH, Naturgeschichte der ausländischen Fische, vol. 6, p. 60, pl. 303, 1792 (Jamaica).

Centropomus undecimalis RÖHL, Fauna descriptiva de Venezuela, p. 402, fig. 216, 1942 (coast of Venezuela).

U.S.N.M. No. 121740, 2 specimens, 87 and 108 mm. in standard length, Lago de Maracaibo, opposite Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121739, a specimen, 119 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 121741, 2 specimens, 67 and 78 mm., Salina Santa Rosa, 3 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121733, 3 specimens, 118 to 140 mm., Lago de Maracaibo at Yacht Club, Maracaibo, February 27 and March 5, 1942.

U.S.N.M. No. 121734, 3 specimens, 66 to 192 mm., Lago de Maracaibo at Yacht Club, May 16, 1942.

U.S.N.M. No. 121737, a specimen, 178 mm., caño ½ mile west of Sinamaica, March 11, 1942.

U.S.N.M. No. 121735, 10 specimens, 94 to 143 mm., Salina Rica, 5 km. north of Maracaibo, in brackish water, February 20, 1942.

U.S.N.M. No. 121736, 4 specimens, 130 to 205 mm., Río Socuy, 3 km. above mouth, February 24, 1942.

U.S.N.M. No. 121732, 11 specimens, 91 to 210 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121738, 1 head, Río de Los Pájaros, 3 km. above Lago de Maracaibo, April 30, 1942.

U.S.N.M. No. 123065, 1 specimen, 360 mm. in standard length, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

The following collections were made by F. F. Bond:

2 specimens, 66.5 to 92 mm., Río Sanchón, 5 km. west of Tavorda, January 26, 1938.

3 specimens, 58.5 to 82 mm., Laguna de Tacarigua, Estado de Miranda, February 3, 1939.

3 specimens, 39 to 67 mm., a bajo seca, east side of Puerto Cabello, January 26, 1938.

2 specimens, 52.5 and 85 mm., salt-water lagoon on coast, 5 km. west of Cuamaná, March 25, 1939.

6 specimens, 32 to 39 mm., Laguna de Río Capatárida, March 21, 1938.

This species was observed in the mouth of Caño de Sagua to reach a length of nearly 3 feet. No specimens of such large size were preserved but one was photographed.

CENTROPOMUS ENSIFERUS Poey

ROBALO

Centropomus ensiferus POEY, Memorias sobre la historia natural de la isla de Cuba, vol. 2, p. 122, pl. 12, fig. 1, 1860 (Havana).

U.S.N.M. No. 121728, 4 specimens, 46 to 138 mm., Lago de Maracaibo at Yacht Club, Maracaibo, February 27 and March 5, 1942.

U.S.N.M. No. 121727, 17 specimens, 53 to 70 mm., Lago de Maracaibo, opposite Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121729, a specimen, 138 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121730, 2 specimens, 137 and 150 mm., Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121731, 3 specimens, 84 to 147 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

One specimen, 74 mm., Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

Family SERRANIDAE: Sea Basses

This family is so poorly represented from Venezuela that it is not practicable to make a key. Instead, the reader is referred to volume 2, pp. 435–436, of Meek and Hildebrand's "The Marine Fishes of Panama" for a key to the genera of Serranidae likely to occur in Venezuela.

Genus PARALABRAX Girard

Paralabrax Girard, Proc. Acad. Nat. Sci. Philadelphia, vol. 8, p. 131, 1856. (Genotype, *Labrax nebulifer* Girard.)

PARALABRAX DEWEGERI (Metzelaar)

Serranus (*Paralabrax*) *dewegeri* Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 52, fig. 20, 1919 (Guanta, Venezuela).

U.S.N.M. No. 123134, a specimen, 127.5 mm. in standard length, from south coast of Gulf, U. S. S. *Niagara*, November 7, 1924.

As this species has never been recognized since its original discovery and probably the specimen before me is only the third one collected and made known, I am giving the following rather full diagnosis and a comparison with other species closely related to it:

The following measurements, expressed in hundredths of the standard length, were made: Greatest depth of body 35.5; length of head 43.9; length of snout 12.5; least width of bony interorbital space 4.97; diameter of eye 8.78; postorbital length of head 23.1; least width of preorbital space 4.31; distance from tip of snout to rear edge of maxillaries 19.0; length of longest gill rakers 3.37; length of caudal peduncle or from rear base of last anal ray to midbase of caudal fin 21.4; least depth of caudal peduncle 14.3; length of pelvic spine 11.4; length of spines of dorsal fin—first 5.49, second 10.1, third 18.3, fourth 19.5, fifth 14.9, sixth 12.8, seventh 12.4, eighth 11.4, ninth 11.2, tenth 13.7; length of anal spines—first 6.20, second 11.8, third 11.9; longest soft ray of dorsal fin 17.9; of anal fin 19.6; of pectoral fin 23.0; of pelvic fin 20.4; longest ray of caudal fin 24.8; distance from tip of snout to origin of dorsal fin 42.6, and to origin of anal fin 63.0; snout tip to pectoral fin insertion 35.5 and to pelvic insertion 37.4.

The following counts were made: Dorsal rays X,14; anal rays III, 7; pectoral fin rays i, 16–i,16; branched caudal fin rays 8 + 7=15; pelvic rays I, 5–I, 5; gill rakers on first gill arch 7 + 1 + 13; number of transverse scale rows just above lateral line from upper edge of gill opening to midbase of caudal fin 75; pores in lateral line 55 with 8 additional ones on caudal fin; scales from dorsal origin to lateral line 11 or 12 and from base of first soft ray of dorsal to lateral line 8; scales from anal origin upward to lateral line 19 or 20 in an oblique row; zigzag scales around least width of caudal peduncle 39 or 40.

Body a little compressed, greatest depth through middle of spiny dorsal; caudal peduncle a little compressed; pelvics inserted under base of pectoral fins; dorsal origin over base of pectorals; anal origin under base of second or third soft ray of dorsal fin and anus close in front of anal fin; distal margin of caudal fin truncate or a little rounded when fully distended; distal margins of soft dorsal and anal fins rounded, that of pectoral rounded with the seventh to ninth branched rays longest, counting down from the dorsal edge; third and fourth dorsal spines longest, the fourth projecting a little beyond third and fifth spines; second and third anal spines projecting about the same amount; scales small, ctenoid, covering body and bases of all fins, and the scales extending two-thirds the way out on the rays of caudal, pectoral, and pelvic fins but not over halfway out on soft dorsal and anal fins; scales occur only on the basal third of the dorsal spines, the membranes being naked; scales occur on operculum and cheeks and forward on top of head to a line connecting across rear of orbits, the rest of the top of head and snout naked; underside of head naked; scales in front of pelvics smaller than elsewhere on body; lower jaw projecting but not quite entering profile; gill membranes free from isthmus, extending far forward; gill rakers moderately long, not quite so long as the least width of the preorbital; each pair of nasal openings separated by a narrow dermal isthmus; the anterior nasal opening, tubelike, with a fringed dermal flap posteriorly; the rear opening with a low fringed tube; interorbital space flat; maxillary reaching to under or a little past rear edge of pupil; teeth on dentary in an enlarged row of short caninelike teeth with a few tiny ones at sides but in a band anteriorly; teeth on upper jaw similar but in a narrow band on sides; villiformlike teeth on vomer and palatines, but apparently no teeth on tongue or pterygoids.

Color in alcohol.—Lower sides with 7 dark brown vertical bars, about twice width of pale interspaces; these bars join along middle of sides to form an irregular mottled pattern; upper sides dark brown with several narrow oblique bars ending at lateral line; posteriorly under soft dorsal two of the vertical dark brown bars are visible and two more on caudal peduncle, these continuous from those ventrally; base of caudal fin with 4 dark brown spots surrounded with paler tan; caudal fin with numerous dark brown spots; base of pectoral fin with dark

brown blotch circled with pale, then posteriorly at base of fin a dark circle; a dark bar extends downward from eye ending on subopercle; pelvic fins very dark brown or blackish; anal and pectorals brown; membranes near tips of dorsal spines anteriorly blackish; soft dorsal mottled with brownish.

Paralabrax dewegeri is related to that group of fishes now represented by the following species: *humeralis* Cuvier and Valenciennes, *callaensis* Starks, *castelnaui* Jordan and Eigenmann, *clathratus* Girard, *nebulifer* Girard, *maculatofasciatus* Steindachner, *maculata* Howell-Rivero, *tortugarum* Longley, and *beta* Hildebrand.

From *nebulifer* and *maculatofasciatus* (of Pacific coast), which have the third dorsal spine much longer than the fourth, it differs by having the third dorsal spine a little shorter than the fourth, and in having fewer scale rows above the lateral line; *clathratus* (of Pacific coast) has more scales, 90 to 100, and more gill rakers, 20 to 24 on the lower part of first arch, instead of 75 and 13 or 14 respectively for *dewegeri*. Two other Pacific coast species, *humeralis* and *callaensis*, have 18 to 22 gill rakers on the lower part of first gill arch and the former has too many scales. *Paralabrax maculata* Howell-Rivero of the Atlantic has but X,11 dorsal rays and only 45 scales. *P. castelnaui* from Rio de Janeiro has but X,12 dorsal rays. There remain two species that may be related to the Venezuelan one, but not closely: They are *Serranus tortugarum* Longley (Carnegie Inst. Washington Year Book No. 34, p. 87, 1935; Longley and Hildebrand, Carnegie Inst. Washington Publ. 517, p. 238, fig. 8, 1940 [south of Tortugas, Fla.]) and *Serranus beta* Hildebrand *in* Longley and Hildebrand (*l. c.*), p. 239, fig. 9, 1940 (south of Tortugas, Fla.). Both of these species have too few soft dorsal rays, X,11 or 12 and X,12, and, in addition, too few scales, 50 or 60, respectively.

Genus HYPOPLECTRUS Gill

Hypoplectrus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 236. (Genotype, *Plectropoma puella* Cuvier and Valenciennes.)

HYPOPLECTRUS UNICOLOR (Walbaum)

Perca unicolor Walbaum, Artedi's Bibliotheca ichthyologicae, vol. 3, p. 352, 1792 (locality not known) (ref. copied).

Hypoplectrus unicolor Tortonese, Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 47, No. 89, p. 52, 1939 (Puerto Cabello, Venezuela).

Genus DIPLECTRUM Holbrook

Diplectrum Holbrook, Ichthyology of South Carolina, ed. 1, p. 32, 1855. (Genotype, *Diplectrum fasciculare* Holbrook=*Perca formosa* Linnaeus.)

DIPLECTRUM RADIALE (Quoy and Gaimard)

Serranus radialis Quoy and Gaimard, *in* Freycinet, Voyage autour du monde . . . "L'Uranie" et "La Physicienne," Poissons, p. 316, 1824 (Rio de Janeiro).

Serranus (*Diplectrum*) *radialis* METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 54, 1919 (Cumaná, Venezuela).

U.S.N.M. No. 123132, 1 specimen, 103 mm., Amuay Bay, U. S. S. *Niagara*, December 9, 1924.

Genus RYPTICUS Cuvier

SOAPFISHES

Rypticus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 60, 1829. (Genotype, *Anthias saponaceus* Bloch and Schneider.)

RYPTICUS ARENATUS Cuvier

PEZ JABON

Rypticus arenatus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 65, pl. 46, 1829 (Brazil).

For a revision of this genus see Schultz and Reid, Proc. U. S. Nat. Mus., vol. 87, pp. 261–270, 1939. On page 269, table 1, the preopercular spines for *R. arenatus* were transposed; they should read 2 in column 2 and 32 in 3.

U.S.N.M. No. 121809, a specimen, 114 mm. in standard length, mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

Genus EPINEPHELUS Bloch

MEROS

Epinephelus BLOCH, Naturgeschichte ausländischen Fische, vol. 7, p. 11, 1793. (Genotype, *Epinephelus marginalis* Bloch=*Perca fasciata* Forskål.) (Ref. copied.)

EPINEPHELUS MORIO (Cuvier and Valenciennes)

MERO CHERNO

Serranus morio CUVIER AND VALENCIENNES, Histoire naturelle des poissons, vol. 2, p. 285, 1828 (New York and San Domingo) (ref. copied).

Epinephelus morio RÖHL, Fauna descriptiva de Venezuela, p. 403, fig. 218, 1942 (coast of Venezuela).

U.S.N.M. No. 123135, a specimen, 271 mm. in standard length, Estanques Bay U. S. S. *Niagara*, December 13, 1924.

EPINEPHELUS INTERSTITIALIS (Poey)

Serranus interstitialis POEY, Memorias sobre la historia natural de la isla de Cuba, vol. 2, p. 127, 1860 (Cuba).

Epinephelus (*Mycteroperca*) *interstitialis* METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 51, fig. 19, 1919 (Guanta, Venezuela).

EPINEPHELUS ADSCENSIONIS (Osbeck)

MERO CABRILLA

Trachinus adscensionis OSBECK, Reise nach Ostindien und China, p. 388, 1765 (Ascension Island) (ref. copied).

Epinephelus adscensionis RÖHL, Fauna descriptiva de Venezuela, p. 402, fig. 217, 1942 (coast of Venezuela).

U.S.N.M. No. 123133, 1 specimen, 104 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

EPINEPHELUS STRIATUS (Bloch)

MERO GALLINA

Anthias striatus BLOCH, Naturgeschichte ausländischen Fishe, vol. 6, p. 92, pl. 324, 1792 (Atlantic Ocean) (ref. copied).

Epinephelus striatus RÖHL, Fauna descriptiva de Venezuela, p. 403, 1942 (coast of Venezuela).

Genus PROMICROPS Poey

Promicrops POEY, Synopsis piscium cubensium, p. 287, 1868. (Genotype, *Serranus guasa* Poey.)

PROMICROPS ITAJARA (Lichtenstein)

MERO BRASIL

Serranus itajara LICHTENSTEIN, Abh. Akad. Wiss. Berlin, 1821, p. 278 (Brazil) (ref. copied).

Promicrops itaiara RÖHL, Fauna descriptiva de Venezuela, p. 402, 1942 (coast of Venezuela).

Genus CEPHALOPHOLIS Bloch and Schneider

Cephalopholis BLOCH and SCHNEIDER, Systema ichthyologiae, p. 311, 1801. (Genotype, *Cephalopholis argus* Bloch.)

CEPHALOPHOLIS FULVUS (Linnaeus)

MULATO

Labrus fulvus LINNAEUS, Systema naturae, ed. 10, p. 287, 1758 (Bahamas).

Cephalopholis fulvus RÖHL, Fauna descriptiva de Venezuela, p. 404, 1492 (coast of Venezuela).

Cephalopholis fulvus punctatus TORTONESE, Bol. Mus. Zool. Anat. Comp. Univ. Torino, vol. 47, No. 89, p. 52, 1939 (Puerto Cabello, Venezuela).

Family PRIACANTHIDAE: Big-eyes

Genus PRIACANTHUS Oken

Priacanthus OKEN, Isis, p. 1782 [=1182], 1817. (Genotype, *Anthias macrophthalmus* Bloch.)

PRIACANTHUS ARENATUS Cuvier and Valenciennes

Priacanthus arenatus CUVIER AND VALENCIENNES, Histoire naturelle des poissons, vol. 3, p. 97, 1829 (Brazil; Atlantic).—RÖHL, Fauna descriptiva de Venezuela, p. 404, 1942 (coast of Venezuela).

Family POMATOMIDAE

Genus POMATOMUS Lacepède

Pomatomus LACEPÈDE, Histoire naturelle des poissons, vol. 4, p. 435, 1802. (Genotype, *Pomatomus skib* Lacepède=*Perca saltatrix* Linnaeus.)

POMATOMUS SALTATRIX (Linnaeus)

PEZ AZUL

Perca saltatrix LINNAEUS, Systema naturae, ed. 10, p. 293, 1758 (America).
Temnodon saltator METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 125, 1919 (Carúpano, Venezuela).
Pomatomus saltatrix RÖHL, Fauna descriptiva de Venezuela, p. 399, 1942 (coast of Venezuela).

The following collections were made by the U. S. S. *Niagara* in the Gulf of Venezuela:

U.S.N.M. No. 123046, 1 specimen, 75 mm. in standard length, Point Macolla, April 19, 1925.
U.S.N.M. No. 123047, 2 specimens, 112 and 125 mm., Salinas Bay, April 5, 1925.
U.S.N.M. No. 123048, 2 specimens, 84 to 266 mm., Piedras Bay, March 14, 1925.
U.S.N.M. No. 123045, 1 specimen, 132 mm., Cape San Román, April 2, 1925.
U.S.N.M. No. 123117, 1 specimen, 515 mm., Salinas Point, December 18, 1924.

Family RACHYCENTRIDAE

Genus RACHYCENTRON Kaup

Rachycentron KAUP, Isis, vol. 19, p. 89, 1826. (Genotype, *Rachycentron typus* Kaup.)

RACHYCENTRON CANADUS (Linnaeus)

SERGEANTFISH; CRABEATER

Gasterosteus canadus LINNAEUS, Systema naturae, ed. 12, p. 491, 1766 (Carolina).

U.S.N.M. No. 123064, a large specimen, from the south coast of the Gulf of Venezuela, U. S. S. *Niagara*, November 8, 1924.

Family CARANGIDAE: Pampanos

The material representing this family from Venezuela is rather scanty. A few genera that are to be expected in Venezuelan waters do not occur in the national collection, but undoubtedly they will be taken when adequate collections are made. I am copying Meek and Hildebrand's "Key to the Genera" of this family from "The Marine Fishes of Panama," part 2, pp. 332–333, 1925. This key, however, has been somewhat modified and more or less restricted to cover the Venezuelan coastal waters.

1*a*. Lateral line wholly or in part armed with bony scutes (very weak and occasionally wanting in *Chloroscombrus*).
2*a*. Dorsal and anal each with a single detached finlet (see also *Elagatis*); dorsal rays VII or VIII, 29 to 31, 1; anal II–I, 25 to 27, 1; lateral scutes 35 to 42 ..... **Decapterus** [17] Bleeker
2*b*. Dorsal and anal without finlets.
3*a*. Shoulder girdle with a deep furrow near its juncture with the isthmus, and a fleshy projection above it; eye large; dorsal rays VIII–I, 23 to 26; anal II–I, 20 to 23; about 23 to 27 gill rakers on lower limb of first gill arch ..... **Trachurops** Gill
3*b*. Shoulder girdle normal, not as above; eye of moderate size.

[17] Not yet reported from Venezuelan waters.

4*a*. Lateral line armed with deep bony scutes for its entire length; last ray of second dorsal and anal enlarged, nearly separate in adult; dorsal rays VII or VIII–I, 29 to 35; anal II–I, 24 to 29.
Trachurus [17] Rafinesque

4*b*. Lateral line with plates in its straight portion only; last ray of second dorsal and anal not notably enlarged.

5*a*. Maxillary very narrow; head small; teeth in jaws in a single close-set series, few or none on vomer, palatines, and tongue; dorsal and anal low; never with salient lobes, each with a conspicuous sheath of scales at base; dorsal rays VII or VIII–I, 26 to 30; anal II–I, 22 to 25 ..... **Hemicaranx** [17] Bleeker

5*b*. Maxillary broad; head rather large; teeth, if present, in one or more series or in bands on jaws, never in a single close-set series as above.

6*a*. Teeth uneven, in one or a few series on jaws, persistent; villiform teeth usually present on vomer, palatines and tongue, these deciduous or wanting in some species; dorsal VII or VIII–I, 18 to 28; anal II–I, 15 to 24 ..... **Caranx** Lacepède

6*b*. Teeth small and even, in a single series, or in villiform bands, on jaws, vomer, tongue, and usually on palatines, at all ages.

7*a*. The back much elevated; the dorsal outline more strongly curved than the ventral.

8*a*. Snout well in advance of the forehead; anterior profile convex; anterior rays of second dorsal and anal filamentous; body strongly ovate in young, somewhat elongate in adult, very strongly compressed, the outlines everywhere trenchant; scales very small; dorsal and anal filaments long, extremely long in young; dorsal rays VI–I, 18 to 20; anal II–I, 15 to 17.
Alectis Rafinesque

8*b*. Snout scarcely in advance of forehead; anterior profile nearly vertical; soft dorsal and anal low, never falcate, the anterior rays not produced into filaments; dorsal rays VIII–I, 21 to 24; anal II–I, 17 to 19 ..... **Vomer** Cuvier

7*b*. The back little elevated; the ventral outline much more strongly curved than the dorsal; lateral line with few very weak bony scutes or none; dorsal rays VIII–I, 26 to 28; anal II–I, 26 to 28; gill rakers slender, close set, 28 to 35 on lower limb of first gill arch ..... **Chloroscombrus** Girard

1*b*. Lateral line entirely unarmed.

9*a*. Second dorsal and anal about equal in length, both longer than the abdomen.

10*a*. Body deep, ovate; premaxillaries protractile; second dorsal and anal fins anteriorly elevated, falcate.

11*a*. Body very closely compressed, the outlines everywhere trenchant; preorbital extremely deep; maxillary broad, with a well-developed supplemental bone; dorsal rays VII or VIII–I, 16 to 23; anal II–I, 15 to 20 ..... **Selene** Lacepède

11*b*. Body less closely compressed, the abdomen never trenchant; preorbital very narrow; maxillary narrow, without a distinct supplemental bone; dorsal rays V to VII–I, 17 to 27; anal II–I, 16 to 24.
Trachinotus Lacepède

10*b*. Body oblong; premaxillaries not protractile, except in very young; maxillary narrow, without a supplementary bone; second dorsal and anal fins low, never falcate; scales embedded, represented by short low

[17] Not yet reported from Venezuelan waters.

ridges set at slightly different angles; dorsal rays IV or V–I, 18 to 21; anal II–I, 18 to 21 ..... **Oligoplites** Gill

9*b*. Anal fin much shorter than second dorsal, its base shorter than abdomen.

12*a*. Dorsal and anal each with a single detached finlet, composed of 2 rays; dorsal rays V or VI–I, 24 to 26–2; anal I or II–I, 16 to 18–2.

Elagatis [17] Bennett

12*b*. Dorsal and anal without finlets.

13*a*. First dorsal with 6 to 8 slender spines, connected by membrane at all ages; lateral line with a long, low arch, forming a slight keel on caudal peduncle in adult; dorsal rays VI to VIII–I, 28 to 36; anal rays I or II–I, 19 to 22 ..... **Seriola** Cuvier

13*b*. First dorsal with 3 or 4 low, stiff spines, separate in adult, or connected by a membrane in very young; lateral line scarcely arched, forming a prominent dermal keel on caudal peduncle; dorsal rays III or IV–I, 26 to 28; anal rays II–I, 15 or 16.

Naucrates Rafinesque

Genus TRACHUROPS Gill

Trachurops Gill, Proc. Acad. Nat. Sci. Philadelphia, vol. 14, pp. 238, 261, 431, 1862. (Genotype, *Scomber crumenophthalmus* Bloch.)

TRACHUROPS CRUMENOPHTHALMA (Bloch)

Big-eyed Scad; Chicharro

Scomber crumenophthalmus Bloch, Naturgeschichte ausländischen Fische, vol. 7, p. 77, 1793 (Acara in Guinea) (ref. copied.)

Caranx (*Trachurops*) *crumenophthalmus* Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 119, 1919 (La Guaira, Venezuela).

Genus CARANX Lacepède

Caranx Lacepède, Histoire naturelle des poissons, vol. 3, p. 57, 1802. (Genotype, *Scomber carangus* Bloch=*Caranx hippos* Linnaeus.)

The three species of *Caranx* so far recorded from Venezuelan waters may be separated by means of the following key:

1*a*. Arch of lateral line usually shorter than straight portion, or about of same length; gill rakers about 13 to 18, omitting rudiments, on lower part of first gill arch.

2*a*. Breast naked, except for a small triangular patch of scales just in front of pelvics; a large opercular dark spot present; gill rakers 13 to 15, omitting rudiments, on lower part of first gill arch; lateral line scutes 25 to 40; second dorsal and anal fins with none or with a few scales in addition to the basal sheath; dorsal rays VII or VIII–I, 18 to 21; anal II–I, 16 or 17 ..... **Caranx hippos** (Linnaeus)

2*b*. Breast covered with small scales; a small dark opercular spot; gill rakers 13 or 14, omitting rudiments, on lower part of first arch; dorsal and anal with sheath of scales only at base; lateral line scutes 35 to 38; dorsal rays VIII–I, 20 to 22; anal II–I, 17 or 18 ..... **Caranx latus** Agassiz

1*b*. Gill rakers about 24 or 25, omitting rudiments, on lower part of first gill arch; depth of body 2.8 to 3.0; mouth 2.3 to 2.5 in head; second dorsal and anal completely covered with minute scales; dorsal rays VIII–I, 23 to 25; anal II–I, 19 or 20; lateral scutes 40 to 50; breast scaly.

Caranx crysos (Mitchill)

[17] Not yet reported from Venezuelan waters.

CARANX HIPPOS (Linnaeus)

JUREL

Scomber hippos LINNAEUS, Systema naturae, ed. 12, p. 494, 1766 (Charleston, S. C.) (ref. copied).

Caranx hippos RÖHL, Fauna descriptiva de Venezuela, p. 398, fig. 210, 1942 (coast of Venezuela).

U.S.N.M. No. 121801, 10 specimens, 143 to 202 mm., market at Maracaibo, probably caught in Gulf of Venezuela, May 15–19, 1942.

The following collections were made by the U. S. S. *Niagara* in the Gulf of Venezuela:

U.S.N.M. No. 123040, 1 specimen, 155 mm., February 20, 1925.

U.S.N.M. No. 123041, 2 specimens, 40 mm., Point Macolla, April 19, 1925.

U.S.N.M. No. 123042, 4 specimens, 36 to 38 mm., Amuay Bay, December 9, 1924.

U.S.N.M. No. 123043, 11 specimens, 41 to 66 mm., Cape San Román, April 2, 1925.

CARANX LATUS Agassiz

Caranx latus AGASSIZ, *in* Spix and Agassiz, Selecta genera et species piscium. . . Brasiliam. . ., p. 105, pl. 56b, fig. 1, pl. E, 1831 (Atlantic).

U.S.N.M. No. 121800, 1 specimen, 184 mm., market at Maracaibo, May 15, 1942.

1 specimen, 51 mm., Río Mamo, 15 km. west of La Guaira, F. F. Bond, November 11, 1938.

1 specimen, 45.5 mm., Río Cumboto, near mouth, 2 km. northwest of Ocumare, F. F. Bond, May 5, 1939.

The following collections were made by the U. S. S. *Niagara* in the Gulf of Venezuela:

U.S.N.M. No. 123058, 1 specimen, 205 mm., Amuay Bay, May 15, 1925.

U.S.N.M. No. 123060, 4 specimens, 50 to 70 mm., Cape San Román, April 2, 1925.

U.S.N.M. No. 123059, 5 specimens, 39 to 93 mm., Amuay Bay, December 9, 1924.

U.S.N.M. No. 123061, 2 specimens, 50 and 53.5 mm., Estanques Bay, February 20, 1925.

CARANX CRYSOS (Mitchill)

Scomber crysos MITCHILL, Trans. Lit. Philos. Soc. New York, vol. 1, p. 424, 1814 (New York).

U.S.N.M. No. 123039, 1 specimen, 178 mm., Estanques Bay, U. S. S. *Niagara*, December 8, 1924.

Genus VOMER Cuvier

Vomer CUVIER, Le règne animal, vol. 2, p. 316, 1817. (Genotype, *Vomer brownii* Cuvier.) (Ref. copied.)

VOMER SETAPINNIS (Mitchill)

Zeus setapinnis MITCHILL, Trans. Lit. Philos. Soc. New York, vol. 1, p. 384, 1814 (New York).

Selene setipinnis METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 123, 1919 (coast of Venezuela).

Genus CHLOROSCOMBRUS Girard

Chloroscombrus Girard, Proc. Acad. Nat. Sci. Philadelphia, 1859, p. 168. (Genotype, *Seriola cosmopolita* Cuvier and Valenciennes=*Scomber chrysurus* Linnaeus.) (Ref. copied.)

CHLOROSCOMBRUS CHRYSURUS (Linnaeus)

Scomber chrysurus Linnaeus, Systema naturae, ed. 12, p. 194, 1766 (Charleston, S. C.) (ref. copied).

U.S.N.M. Nos. 123054 to 123056, 3 specimens, 131 to 192 mm., U. S. S. *Niagara* Estanques Bay, December 7–8, 1294.

U.S.N.M. No 123057, 3 specimens, 25.5 to 27 mm., south coast, U. S. S. *Niagara*, November 15, 1925.

Genus SELENE Lacepède

Selene Lacepède, Histoire naturelle des poissons, vol. 4, p. 560, 1802. (Genotype, *Selene argentea* Lacepède=*Zeus vomer* Linnaeus.)

SELENE VOMER (Linnaeus)

Lamparosa o Pez luna

Zeus vomer Linnaeus, Systema naturae, ed. 10, p. 266, 1758 (America).

Selene vomer Röhl, Fauna descriptiva de Venezuela, p. 398, fig. 212, 1942 (Coast of Venezuela).

The following collections were made by the U. S. S. *Niagara* in the Gulf of Venezuela in 1925:

U.S.N.M. No. 123053, one specimen, 79 mm., Cape San Román, April 2.
U.S.N.M. No. 123050, one specimen, 49 mm., Jacuque Point, January 26.
U.S.N.M. No. 123049, one specimen, 32 mm., Point Macolla, April 19.
U.S.N.M. No. 123051, one specimen, 135 mm., Gulf of Venezuela, February 20.
U.S.N.M. No. 123052, one specimen, 138 mm., Piedras Bay, March 14.
U.S.N.M. No. 123063, one specimen, 260 mm., Amuay Bay, May 15.

Genus TRACHINOTUS Lacepède

Trachinotus Lacepède, Histoire naturelle des poissons, vol. 3, p. 78, 1802. (Genotype, *Scomber falcatus* Forskål.)

KEY TO THE SPECIES OF TRACHINOTUS REPORTED FROM VENEZUELA

1*a*. Dorsal rays VII, 17 to 21; anal III, 16 to 20; second or soft dorsal and anal fins greatly elongate, falcate anteriorly in adults.

2*a*. Depth 1.45 to 1.9; dorsal rays usually VII, 19 to 21; anal III, 17 or 18; gill rakers 9 to 12 on lower part of first arch with 2 or 3 more rudiments; no vertical dark bars on sides ..... **Trachinotus falcatus** (Linnaeus)

2*b*. Depth 1.9 to 2.65; dorsal rays usually VII, 19 or 20; anal rays III, 17 or 18; gill rakers on lower limb of first arch 8 to 10 with 2 or 3 more rudiments; sides with 4 or 5 narrow dark crossbars, absent on specimens 75 mm. in standard length ..... **Trachinotus glaucus** (Bloch)

1*b*. Dorsal rays usually VII, 23 to 25; anal III, 20 to 23; depth 2.0 to 2.35; gill rakers on lower part of first arch 7 to 9, not including rudiments, usually 3 of latter; anterior rays of soft dorsal and anal fins reaching about to middle of base of fins in adults ..... **Trachinotus carolinus** (Linnaeus)

TRACHINOTUS FALCATUS (Linnaeus)

Labrus falcatus Linnaeus, Systema naturae, ed. 10, p. 284, 1758 (America).

U.S.N.M. No. 121799, 1 specimen, 25.5 mm., Lago de Maracaibo at Maracaibo Yacht Club, Maracaibo, February 27.

TRACHINOTUS GLAUCUS (Bloch)

Pámpano

Chaetodon glaucus Bloch, Naturgeschichte ausländische Fische, vol. 3, p. 112, pl. 210, 1787 (Martinique) (ref. copied).

Trachinotus glaucus Röhl, Fauna descriptiva de Venezuela, p. 398, fig. 211, 1942 (coast of Venezuela).

Trachinotus goodei Röhl, Fauna descriptiva de Venezuela, p. 398, 1942 (coast of Venezuela).

U.S.N.M. No. 123068, 3 specimens, 24 to 84 mm., Cape San Román, U. S. S. *Niagara*, April 2, 1925.

U.S.N.M. No. 123066, 1 specimen, 36 mm., Estanques Bay, U. S. S. *Niagara*, February 20, 1925.

U.S.N.M. No. 123069, 7 specimens, 68 to 147 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

TRACHINOTUS CAROLINUS (Linnaeus)

Pámpano

Gasterosteus carolinus Linnaeus, Systema naturae, ed. 12, p. 490, 1766 (Carolina) (ref. copied).

One specimen, 21.5 mm., Río Mamo, 15 km. west of La Guaira, F. F. Bond, October 11, 1938.

U.S.N.M. No. 123071, 7 specimens, 21 to 66 mm., Piedras Bay, U. S. S. *Niagara*, March 14, 1925.

U.S.N.M. No. 123070, 2 specimens, 17.5 to 21.5 mm., south coast of Gulf, U. S. S. *Niagara*, November 15, 1925.

Genus OLIGOPLITES Gill

Leatherjackets

Oligoplites Gill, Proc. Acad. Nat. Sci. Philadelphia, 1863, p. 166. (Genotype, *Oligoplites inornatus* Gill.)

In an attempt to determine what name should be applied to the *Oligoplites* inhabiting Lago de Maracaibo I made a study of nearly all the specimens of this genus in the United States National Museum. My results were published (Schultz, 1945d) and it is not deemed necessary to repeat them here. In all, seven species were recognized, three in the Atlantic and four in the Pacific, all in American waters.

KEY TO THE SPECIES OF OLIGOPLITES FROM THE WESTERN ATLANTIC

1*a*. Number of gill rakers on first arch, including rudiments, 5 to 7 + 16 to 20; premaxillary with a single row of short conical teeth along its entire length, except in young this row is irregular or nearly in two rows anteriorly at front of snout: teeth on dentary in two distinct rows; dorsal rays IV–I, 20 or 21; depth 3 to 3.4; head 1.3 in young, 1.4 to 1.6 in adults; posterior margin of maxillary more or less truncate----------**Oligoplites saliens** (Bloch)

1*b*. Number of gill rakers on first arch, including rudiments, 4 to 6 + 1 + 12 to 14.

2*a*. Premaxillary with a band of villiformlike teeth along its entire length, posteriorly narrow, but anteriorly wide, consisting of several rows; teeth on dentary becoming a band anteriorly; dorsal rays IV–I, 19 to 21, rarely with V free spines; depth 3.4 to 3.8; head in greatest depth of body 1.2 to 1.4; posterior tip of maxillary rounded, reaching past orbits in adults; gill rakers on lower limb of first arch 12 or 13.

Oligoplites palometa (Cuvier and Valenciennes)

2*b*. Premaxillary teeth essentially in two distinct rows along its entire length except far posteriorly, where it may become an irregular row, and far anteriorly near tip of snout where a minute row of teeth may occur between the two distinct ones; teeth on dentary in two rows; dorsal rays V–I, 18 to 21, rarely IV or V free spines; depth 3.4 to 4.1; head in greatest depth 1.0 to 1.6; posterior edge of maxillary rounded and usually not reaching past orbits; gill rakers on lower limb of first arch usually 13 or 14, counting rudiments.....**Oligoplites saurus saurus** (Bloch)

OLIGOPLITES SALIENS (Bloch)

Zapatero de mar

Scomber saliens Bloch, Ichthyologie, ou Histoire naturelle des poissons, vol. 10, p. 41, pl. 335, 1797 (Antilles).

I have examined specimens of this species from the Atlantic coast of Central America, Gulf of Venezuela, Trinidad, and Brazil. The following specimens were collected by the U. S. S. *Niagara* in the Gulf of Venezuela:

U.S.N.M. No. 123075, 1 specimen, 84 mm. in standard length, from Amuay Bay, December 9, 1924.

U.S.N.M. No. 123073, 1 specimen, 79 mm., Estanques Bay, February 20, 1925.

U.S.N.M. No. 123074, 1 specimen, 33.5 mm., from south coast, November 15, 1925.

OLIGOPLITES PALOMETA (Cuvier and Valenciennes)

Palometa de lago

Chorinemus palometa Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 8, p. 392, 1831 (Lake Maracaibo).

Chorinemus saliens, var. *palometa* Günther, Catalogue of the fishes in the British Museum, vol. 2, p. 475, 1860 (Lake Maracaibo).

Oligoplites saliens palometa Jordan and Evermann, U. S. Nat. Mus. Bull. 47, pt. 1, p. 899, 1896 (Lake Maracaibo).

Oligoplites palometa Jordan, Evermann, and Clark, Rep. U. S. Comm. Fish. for 1928, pt. 2, p. 278, 1930 (Lake Maracaibo).

Scombroides palometa Regan, Biologia Centrali-Americana, Pisces, p. 15, fig., 1908 (Lago Yzabal, Guatemala; Lago de Maracaibo, Venezuela).

U.S.N.M. No. 121804, 4 specimens, 114 to 230 mm., Lago Maracaibo near mouth of Río Concha, May 2, 1942.

U.S.N.M. No. 121805, 2 specimens, 230 and 290 mm., from Río de Los Pájaros, 3 km. above Lago de Maracaibo, April 30, 1942.

U.S.N.M. No. 121803, 1 specimen, 335 mm., from market at Maracaibo, May 15, 1942.

U.S.N.M. No. 121806, 1 specimen, 123 mm., from Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 123072, 1 specimen, 24 mm., south coast of Gulf of Venezuela, U. S. S. *Niagara*, November 15, 1925.

The specimens from the mouth of the Río de Los Pájaros had been feeding on anchovies.

OLIGOPLITES SAURUS SAURUS (Bloch and Schneider)

ZAPATERO

Scomber saurus BLOCH AND SCHNEIDER, Systema ichthyologiae, p. 32, 1801 (Jamaica).

Oligoplites saurus RÖHL, Fauna descriptiva de Venezuela, p. 399, fig. 213, 1942 (coast of Venezuela).

U.S.N.M. No. 123077, 1 specimen, 86 mm., from Salinas Bay, U. S. S. *Niagara*, April 4, 1925.

U.S.N.M. No. 123078, 1 specimen, 128 mm., from Amuay Bay, U. S. S. *Niagara*, December 9, 1924.

U.S.N.M. No. 123076, 3 specimens, 69 to 74 mm., from Estanques Bay, U. S. S. *Niagara*, February 20, 1925.

Genus SERIOLA Cuvier

Seriola CUVIER, Le règne animal, vol. 2, p. 315, 1817. (Genotype, *Caranx dumerili* Risso.) (Ref. copied.)

SERIOLA DUMERILI (Risso)

Caranx dumerili RISSO, Ichthyologie de Nice, p. 175, pl. 6, fig. 20, 1810 (Nice).

Seriola dumerili RÖHL, Fauna descriptiva de Venezuela, p. 400, 1942 (coast of Venezuela).

Genus NAUCRATES Rafinesque

Naucrates RAFINESQUE, Caratteri di alcuni nuovi generi e nuove specie di animali Sicilia, p. 43, 1810. (Genotype, *Naucrates fanfarus* Rafinesque=*Gasterosteus ductor* Linnaeus.) (Ref. copied.)

NAUCRATES DUCTOR (Linnaeus)

PILOTFISH; PILOTO

Gasterosteus ductor LINNAEUS, Systema naturae, ed. 10, p. 295, 1758.

Naucrates ductor RÖHL, Fauna descriptiva de Venezuela, p. 400, 1942 (coast of Venezuela).

Family CORYPHAENIDAE

DOLPHINS; DORADO

Genus CORYPHAENA Linnaeus

Coryphaena LINNAEUS, Systema naturae, ed. 10, p. 261, 1758. (Genotype, *Coryphaena hippurus* Linnaeus.)

CORYPHAENA HIPPURUS Linnaeus

Coryphaena hippurus LINNAEUS, Systema naturae, ed. 10, p. 261, 1758 (open seas).—RÖHL, Fauna descriptiva de Venezuela, p. 400, fig. 214, 1942 (coast of Venezuela).

Family LUTJANIDAE: Snappers; Pargos

This family is represented by so few species and specimens from Venezuela that it is not practicable to make a key. Instead, the reader is referred to volume 2, p. 491, 1925, of Meek and Hildebrand's "The Marine Fishes of Panama" for a key to the genera of the Lutjanidae likely to occur in Venezuela.

Genus LUTJANUS Bloch

Lutjanus Bloch, Naturgeschichte der ausländischen Fische, vol. 4, p. 107, 1790. (Genotype, *Lutjanus lutjanus* Bloch.)

LUTJANUS GUTTATUS (Steindachner)

Mesoprion guttatus Steindachner, Sitzb. Akad. Wiss. Wien, vol. 60, p. 18, pl. 8, 1869 (Mazatlán).

The following specimen, collected by the U. S. S. *Niagara* in the Gulf of Venezuela, is referred to this species with some uncertainty:

U.S.N.M. No. 123139, a specimen, 48 mm., Amuay Bay, December 9, 1924.

LUTJANUS GRISEUS (Linnaeus)

Pargo de Piedra; Aguadera; o Caballerote

Labrus griseus Linnaeus, Systema naturae, ed. 10, p. 283, 1758 (Bahamas).
Lutianus griseus Röhl, Fauna descriptiva de Venezuela, p. 405, fig. 220, 1942 (coast of Venezuela).

U.S.N.M. No. 123140, 1 specimen, 53.5 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

LUTJANUS JOCU (Bloch and Schneider)

Jocú

Anthias jocu Bloch and Schneider, Systema ichthyologiae, p. 310, 1801 (Cuba).

U.S.N.M. No. 123137, 2 specimens, 70 to 71.5 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

One specimen, 70 mm., Río Borburata at mouth, 3 km. east of Puerto Cabello, F. F. Bond, January 15, 1938.

LUTJANUS APODUS (Walbaum)

Caji

Perca apoda Walbaum, Artedi's Bibliotheca ichthyologicae, vol. 3, p. 351, 1792 (ref. copied).

U.S.N.M. No. 123138, a specimen, from Point Macolla, U. S. S. *Niagara*, April 19, 1925.

LUTJANUS SYNAGRIS (Linnaeus)

Biajaiba

Sparus synagris Linnaeus, Systema naturae, ed. 10, p. 280, 1758 (Bahamas).
Lutianus [s]*aynagris* Röhl, Fauna descriptiva de Venezuela, p. 404, 1942 (coast of Venezuela).
Mesoprion uninotatus Günther, Catalogue of the fishes in the British Museum, vol. 1, p. 202, 1859 (Puerto Cabello).

LUTJANUS AYA (Bloch)

El pargo real

Bodianus aya Bloch, Naturgeschichte der ausländischen Fische, pt. 4, p. 45, pl. 227, 1790 (Brazil).

Lutianus aya Röhl, Fauna descriptiva de Venezuela, p. 405, fig. 219, 1942 (coast of Venezuela).

LUTJANUS ANALIS (Cuvier and Valenciennes)

Pargo sebadal o Ceibadal

Mesoprion analis Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 2, p. 452, 1828 (San Domingo).

Lutianus analis Röhl, Fauna descriptiva de Venezuela, p. 405, fig. 221, 1942 (coast of Venezuela).

U.S.N.M.No. 123141, 8 specimens, 52.5 to 156 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

Genus RHOMBOPLITES Gill

Rhomboplites Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 236. (Genotype, *Centropristes aurorubens* Cuvier and Valenciennes.)

RHOMBOPLITES AURORUBENS (Cuvier and Valenciennes)

Pargo guachinango o Mal nombre

Centropristes aurorubens Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 3, p. 45, 1829 (Brazil; Martinique; San Domingo).

Rhomboplites aurorubens Röhl, Fauna descriptiva de Venezuela, p. 406, fig. 222, 1942 (coast of Venezuela).

Genus OCYURUS Gill

Ocyurus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 236. (Genotype, *Sparus chrysurus* Bloch.)

OCYURUS CHRYSURUS (Bloch)

Rabirubia

Sparus chrysurus Bloch, Naturgeschichte ausländischen Fische, vol. 5, p. 28, pl. 262, 1791 (Brazil) (ref. copied).—Röhl, Fauna descriptiva de Venezuela, p. 406, 1942 (coast of Venezuela).

Family EMMELICHTHYIDAE

Genus INERMIA Poey

Inermia Poey, Memorias sobre la historia natural de la isla de Cuba, vol. 2, p. 193, 1860. (Genotype, *Inermia vittata* Poey.)

INERMIA VITTATA Poey

Inermia vittata Poey, Memorias sobre la historia natural de la isla de Cuba, vol. 2, p. 193, pl. 14, fig. 3, 1860 (Cuba).—Jordan, Evermann, and Clark, Rep. U. S. Comm. Fish. for 1928, pt. 2, p. 340, 1930 (Venezuela), probably based on Jordan, Copeia, 1922, No. 106, p. 34 (Curaçao).

In my revision of the family Emmelichthyidae (Schultz, 1945b) I described a new genus and species from the Bahamas.

Family POMADASYIDAE: Grunts; Roncos

KEY TO GENERA REPORTED FROM VENEZUELA

1*a*. Gill membranes broadly connected across the isthmus, with a free fold; 2 pairs of pores on chin; preopercle serrate, with 2 spines at lower angle a little enlarged; no spines directed forward; snout short; lower jaw a little shorter than upper, mouth short; preorbital very narrow, about 3 times in eye; dorsal with shallow notch between spiny and soft portions; soft rays of dorsal and anal fins with a basal sheath of scales but no scales on interradial membranes or on rays; depth about 2 and head 3⅓; dorsal rays XIII, 12; anal III, 10 ..... **Genyatremus** Gill

1*b*. Gill membranes narrowly connected forward across apex of isthmus, forming a more or less acute angle, with a narrow free fold; on chin, one pair of pores behind which is a median pore.

2*a*. Soft rays of dorsal and anal fins without scales on interradial membranes or on rays except the sheath of scales along base of these fins.

3*a*. Preopercle strongly serrate with 2 or 3 spines somewhat enlarged at lower angle; second anal spine enlarged; lower jaw a little shorter than upper; dorsal fin notched nearly to base between spiny and soft portions; preorbital width about two-thirds of or equal to eye; dorsal rays XI to XIV, 11 to 15; anal III, 6 to 8 ..... **Pomadasys** Lacepède

3*b*. Preopercle very finely serrate; second anal spine scarcely larger than third spine; jaws equal; dorsal fin not notched; preorbital wider than or about as wide as eye; depth 2.5, head about 3; dorsal rays XII or XIII, 12 to 17; anal III, 9 to 13 ..... **Orthopristis** Girard

2*b*. Soft rays of dorsal and anal fins with scales on interradial membranes in addition to the basal sheath of scales; second anal spine enlarged; dorsal fins deeply notched nearly to base between spiny and soft parts.

4*a*. Preopercle strongly serrate with one or two enlarged spines at lower angle and the serrae along ventral edge directed forward, at least on adults; lower jaw a little longer than upper jaw; depth about 3.4; head about 3; dorsal rays XII, 12 or 13; anal III, 8 ..... **Conodon** Cuvier

4*b*. Preopercle serrate but no spines enlarged and none directed forward; lower jaws slightly shorter than upper jaw; depth about 2.4; head 2.8; dorsal rays XI to XIII, 13 to 18; anal III, 8 to 10.

Anisotremus Gill

2*c*. Soft rays of dorsal and anal fins profusely covered with scales.

5*a*. Second and third anal spines about equally enlarged; preopercular edge serrate; lower jaw about equal to upper jaw; preorbital width not as wide as eye.

6*a*. A shallow depression between spiny and soft part of dorsal fin; base of caudal fin with a black spot, extending a little on caudal peduncle; depth about 2.8 to 3; head about 2.8; dorsal spines XIII, 13 to 15; anal III, 8 or 9 ..... **Bathystoma** Scudder

6*b*. Dorsal fin with a deep notch, nearly to base, between spiny and soft parts; base of caudal fin without a black spot; depth about 2.9 to 3.25; head about 3 to 3.25; dorsal rays XII, 13; anal III, 9 to 10.

Brachygenys [18] Scudder

5*b*. Second anal spine greatly enlarged; preopercle weakly serrate; lower jaw a little shorter than upper jaw; preorbital as wide as or wider than eye; dorsal fin notched nearly to base; back elevated; dorsal rays XI or XII, 14 to 17; anal III, 7 to 9; lips usually thick ..... **Haemulon** Cuvier

[18] Not yet reported from Venezuela although found on both sides.

Genus GENYATREMUS Gill

Genyatremus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1862, p. 256. (Genotype, *Diagramma cavifrons* Cuvier and Valenciennes=*Lutjanus luteus* Bloch.)

GENYATREMUS LUTEUS (Bloch)

Lutjanus luteus Bloch, Ichthyologie, ou Histoire naturelle des . . . poissons, vol. 7, p. 89, pl. 247, 1797.

U.S.N.M. No. 121808, a specimen, 213 mm. in standard length, from market at Maracaibo, May 15, 1942.

U.S.N.M. No. 121807, a specimen, 112 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

This characteristic genus and species in general resembles *Anisotremus* but differs in the very narrow preorbital, its least depth is contained about 3 times in the eye and 9 times in the head; in addition the gill membranes form a broad fold across the isthmus as in the Kyphosidae, but the gill membranes are naked. In *Anisotremus* the posterior edge of the gill membranes form an acute angle over the isthmus, and in *Genyatremus* this is evenly curved. There are no scales on the soft rays or membranes of the dorsal and anal fins, only a sheath of scales basally, in *Genyatremus*, whereas in *Anisotremus* the median fins are scaled wholly or in part, always some scales on the interradial membranes. The dorsal rays are XIII, 12 and anal III, 10 in both specimens from Venezuela. The pectoral fins are equal in length in the distance from the nostrils to rear of head. The margins of the dorsal fins are blackish; there is some indication of a dark, wide, wedge-shaped saddle in front of the dorsal fin, and another over the region of the orbits, both barely discernible in the alcoholic specimens.

Genus POMADASYS Lacepède

Pomadasys Lacepède, Histoire naturelle des poissons, vol. 4, p. 515, 1802. (Genotype, *Sciaena argentea* Fôrskal.)

POMADASYS CROCRO (Cuvier and Valenciennes)

Pristipoma crocro Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 264, 1830 (Martinique).

The identification is not certain because of small size and lack of intermediate sizes.

6 specimens, 21 to 33 mm., Río Guaiguaza, 3 km. west of Puerto Cabello, F. F. Bond, January 15, 1938.

1 specimen, 22 mm., Río Mamo, 15 km. west of La Guaira, F. F. Bond, November 11, 1938.

Genus ORTHOPRISTIS Girard

Orthopristis Girard, United States and Mexican boundary survey, Ichthyology, p. 15, 1859. (Genotype, *Orthopristis duplex* Girard=*Perca chrysopterus* Linnaeus.)

ORTHOPRISTIS RUBER (Cuvier)

Pristipoma rubrum Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 283, 1830 (Brazil).

U.S.N.M. No. 123136, 1 specimen, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.
U.S.N.M. No. 123123, 6 specimens, 114 to 158 mm., Estanques Bay, U. S. S. *Niagara*, December 7 to 11, 1924.

I have made the following counts on the specimens listed above: Dorsal rays XII, 14 in one; XII, 15 in four, and XII, 16 in one; anal rays III, 9 in three and III, 10 in three; gill rakers on lower limb of first gill arch number 11 in three and 12 in one, the raker at the angle not included and the upper part of the arch has about 10 rakers. There are 9 or 10 scales from lateral line to base of first dorsal spine and a more or less distinct dark shoulder blotch.

Genus CONODON Cuvier

Conodon Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 156, 1830. (Genotype, *Conodon antillanus* Cuvier=*Perca nobilis* Linnaeus.)

CONODON NOBILIS (Linnaeus)

Perca nobilis Linnaeus, Systema naturae, ed. 10, p. 191, 1758 (North America).

U.S.N.M. No. 123119, 1 specimen, 65 mm. in standard length, Point Macolla, U. S. S. *Niagara*, April 19, 1925.
U.S.N.M. No. 123118, 1 specimen, 270 mm., Estanques Bay, U. S. S. *Niagara*, December 7, 1924.
U.S.N.M. No. 123120, 1 specimen, 54 mm., Cape San Román, U. S. S. *Niagara*, April 2, 1925.

Genus ANISOTREMUS Gill

Anisotremus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1861, pp. 32, 105. (Genotype, *Pristipoma rodo* Cuvier and Valenciennes=*Sparus virginicus* Linnaeus.)

ANISOTREMUS SURINAMENSIS (Bloch)

Lutjanus surinamensis Bloch, Naturgeschichte der ausländischen Fische, vol. 5, p. 3, pl. 253, 1791 (Surinam) (ref. copied).

U.S.N.M. No. 123121, a specimen, 235 mm. in standard length, from Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

Genus BATHYSTOMA Scudder

Bathystoma Scudder, *in* Putnam, Bull. Mus. Comp. Zool., vol. 1, p. 12, 1863. (Genotype, *Perca melanura* Linnaeus=*Haemulon jeniguano* Poey.) (Ref. copied.)

BATHYSTOMA RIMATOR (Jordan and Swain)

Haemulon rimator Jordan and Swain, Proc. U. S. Nat. Mus., vol. 7, p. 308, 1884 (Charleston, S. C.; Key West and Pensacola, Fla.).

Haemulon (*Bathystoma*) *rimator* Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies in 1904–1905, p. 81, 1919 (Puerto Cabello, Venezuela).

Genus HAEMULON Cuvier

Haemulon Cuvier, Le règne animal, ed. 2, vol. 2, p. 175, 1829. (Genotype, *Haemulon elegans* Cuvier=*Sparus sciurus* Shaw.) (Ref. copied.)

A more complete key to the species of *Haemulon* likely to occur in Venezuela will be found in volume 2 of Meek and Hildebrand's "The Marine Fishes of Panama."

KEY TO THE SPECIES OF HAEMULON REPORTED FROM VENEZUELA

1*a*. Scales below lateral line enlarged, very deep; sides with yellow stripes, parallel with lateral line above it, very oblique below it; dorsal rays XII, 14 or 15; anal III, 7 or 8; scales 47 to 53--**Haemulon flavolineatum** (Desmarest)

1*b*. Scales below lateral line not notably enlarged; 5 or more scales between lateral line and dorsal origin.

2*a*. Maxillary reaching to below middle of eye or nearly so, 1.8 to 2⅓ in head; gill rakers on lower part of first gill arch 16 to 18; head and body with about 10 lengthwise blue stripes (pale in alcohol) usually best defined on snout and cheeks; soft dorsal with convex margin; dorsal rays XII, 16 or 17; anal III, 8 or 9; scales 48 to 57------**Haemulon sciurus** (Shaw)

2*b*. Maxillary reaching scarcely past anterior margin of eye, about 2 to 2⅘ in head; sides with stripes following rows of scales.

3*a*. Rows of scales with pearly gray stripes; caudal spot present; maxillary 2 to 2.1 in head; snout long pointed, 2.5 to 2.8 in head; dorsal rays XII, 15 to 17; anal III, 8 or 9; scales 53 to 62.

Haemulon steindachneri (Jordan and Gilbert)

3*b*. Rows of scales with continuous dark lines, wavy above lateral line; dorsal rays XII, 15 to 17; anal III, 8 or 9; scales 43 to 50.

Haemulon bonariense Cuvier

HAEMULON FLAVOLINEATUM (Desmarest)

COROCORO; AMARILLO

Diabasis flavolineatus DESMAREST, Première decade ichthyologique, p. 35, pl. 2, fig. 1, 1823 (Cuba) (ref. copied).

Haemulon flavolineatum RÖHL, Fauna descriptiva de Venezuela, p. 407, 1942 (coast of Venezuela).

HAEMULON SCIURUS (Shaw)

CACHICOTO

Sparus sciurus SHAW, General zoology, vol. 4, p. 64, 1803 (Antilles; based on *Anthias formosus* Bloch) (ref. copied).

Haemulon sciurus Röhl, Fauna descriptiva de Venezuela, p. 406, fig. 223, 1942 (coast of Venezuela).

HAEMULON STEINDACHNERI (Jordan and Gilbert)

Diabasis steindachneri JORDAN AND GILBERT, Bull. U. S. Fish Comm. for 1881, vol. 1, p. 322, 1882 (Panama; Mazatlán) (ref. copied).

Haemulon steindachneri METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 79, 1919 (Guanta, Venezuela).

HAEMULON BONARIENSE Cuvier

Haemulon bonariense CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 234, 1830 (Buenos Aires).—METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 77, fig. 25, 1919 (Venezuela).

Family SPARIDAE: Pargos

KEY TO THE GENERA AND SPECIES OF SPARIDAE REPORTED FROM VENEZUELA

1*a*. Front teeth conical or pointed, not incisorlike.

2*a*. Second interhaemal spine enlarged and hollowed anteriorly; preorbital much wider than eye; head 3.25 to 4; depth 2 to 2.2; dorsal rays XII, 12; anal III, 11; scales 50 to 53; about 6 blunt gill rakers on lower limb of first gill arch ..... **Calamus calamus** (Cuvier)

2*b*. Second interhaemal spine normal, not swollen and hollow; preorbital as wide as or broader than eye in large adults; depth about 3⅓; head nearly 4; depth 3⅓; dorsal rays XII, 11; anal III, 8; scales about 54 to 57; about 9 blunt gill rankers on lower part of first arch .. **Pagrus pagrus** (Linnaeus)

1*b*. Teeth at front of jaws broad incisors.

3*a*. A small antrorse spine at origin of dorsal, this spine visible by dissection; no black spot on caudal peduncle; sides barred, often disappearing in adults.

4*a*. Dorsal rays XIII, 11 or 12; anal III, 10 or 11; scales 43 to 48; a black blotch on lateral line below origin of dorsal fin; sides with yellowish stripes; margin of dorsal blackish; sides of body sometimes with traces of dark vertical bars ..... **Archosargus unimaculatus** (Bloch)

4*b*. Dorsal rays XII, 12; anal III, 10; scales about 52; no black shoulder spot; 7 persistent dark vertical bars; no lengthwise stripes on sides; pelvic fins blackish ..... **Archosargus aries** (Cuvier)

3*b*. No antrorse spine at dorsal origin; a large black blotch on caudal peduncle just behind base of last dorsal ray; dorsal rays XII, 14 or 15; anal III, 13; scales about 56 to 60 ..... **Diplodus argenteus** (Cuvier)

Genus CALAMUS Swainson

Calamus Swainson, The natural history and classification of fishes, vol. 2, p. 221, 1839. (Genotype, *Pagellus calamus* Cuvier and Valenciennes=*Calamus megacephalus* Shaw.) (Ref. copied.)

CALAMUS CALAMUS (Cuvier)

Pes de pluma

Pagellus calamus Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 6, p. 206, pl. 152, 1830 (Martinique; San Domingo).

Calamus calamus Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 86, 1919 (Puerto Cabello, Venezuela).

Genus PAGRUS Cuvier

Besugo

Pagrus Cuvier, Règne animal, ed. 1, vol. 2, p. 272, 1817. (Genotype, *Sparus argenteus* Bloch=*Sparus pagrus* Linnaeus.) (Ref. copied.)

PAGRUS PAGRUS (Linnaeus)

Sparus pagrus Linnaeus, Systema naturae, ed. 10, p. 279, 1758 (southern Europe).

Pagrus vulgaris Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 87, 1919 (coast of Venezuela).

Genus ARCHOSARGUS Gill

SARGO

Archosargus GILL, Can. Nat., vol. 2, p. 266, 1865. (Genotype, *Sparus probatocephalus* Walbaum.)

ARCHOSARGUS UNIMACULATUS (Bloch)

Perca unimaculata BLOCH, Naturgeschichte der ausländischen Fische, vol. 6, pl. 308, fig. 1, 1792 (Brazil).

Sargus unimaculatus METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 88, 1919 (Guanta, Venezuela).

U.S.N.M. No. 123126, 2 specimens, 179 and 194 mm. in standard length, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

U.S.N.M. No. 123125, 1 specimen, 88 mm., Amuay Bay, U. S. S. *Niagara*, December 9, 1924.

U.S.N.M. No. 123124, 1 specimen, 24 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

ARCHOSARGUS ARIES (Cuvier)

SARGO

Sargus aries CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 6, p. 58, 1830 (Rio de Janeiro; Lago de Maracaibo).

Archosargus aries JORDAN, EVERMANN, and CLARK, Rep. U. S. Comm. Fisheries, 1928, p. 338, 1930 (Maracaibo).

U.S.N.M. No. 123127, 1 specimen, 227 mm. in standard length, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

Genus DIPLODUS Rafinesque

Diplodus RAFINESQUE, Indice d'ittiologia siciliana, p. 54, 1810. (Genotype, *Sparus annularis* Linnaeus.) (Ref. copied.)

DIPLODUS ARGENTEUS (Cuvier)

SARGO

Sargus argenteus CUVIER, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 6, p. 60, 1830 (Brazil).

U.S.N.M. No. 123128, 1 specimen, 218 mm. in standard length, Estanques Bay, U. S. S. *Niagara*, December 11, 1924.

Family GERRIDAE: Mojarras; Carpetas

The following abridged key to the genera of Gerridae was extracted from a manuscript on West Indian fishes by Luis René Rivas, of Cuba, through his kindness and with his permission:

1*a*. Preopercular margin entire; second dorsal spine about equal to or shorter than distance between tip of snout and posterior margin of orbit; second anal spine shorter than caudal peduncle, more than 6 in standard length; greatest depth of body 2.3 to 3.3, usually 2.4 to 3.2 in standard length; maxillary usually not quite reaching to vertical from anterior margin of pupil; air bladder ending posteriorly in a median extension, or in a pair of diverticula; anterior interhaemal bone simple, or with a funnel or spoon-shaped cavity.

2*a*. Air bladder ending posteriorly in a median extension reaching backward and downward into a cavity in the anterior interhaemal bone, which is funnel- or spoon-shaped; depressed area over premaxillary processes longer than wide, crossed by scales in front leaving a naked pit behind, or open and narrowly U-shaped and sometimes slightly restricted by scales in front. Sides of body without vertical dark bands.

Eucinostomus Baird and Girard

2*b*. Air bladder ending posteriorly in a pair of diverticula extending backward on each side of the anterior interhaemal bone, which is simple; depressed area over premaxillary processes about as long as wide, always open and broadly U-shaped; sides of body crossed by vertical irregular dark bands.

Gerres Cuvier

1*b*. Preopercular margin serrate; second dorsal spine longer than distance between tip of snout and posterior margin of orbit; second anal spine about equal to or longer than caudal peduncle, less than 6 in standard length; greatest depth of body 1.7 to 2.4, usually 1.8 to 2.3 in standard length; maxillary reaching to or beyond vertical from anterior margin of pupil; air bladder ending bluntly, without posterior diverticulum or median extension; anterior interhaemal bone simple.

3*a*. Sides of body without longitudinal black stripes; preorbital entire; second anal spine shorter than anal base; its length 2.2 to 3.2, usually 2.3 to 3.1 in greatest depth of body; greatest depth of body 1.7 to 2.1, usually 1.8 to 2.0 in standard length; anal base 3.8 to 4.5, usually 3.9 to 4.4 in standard length; last dorsal spine 2.0 to 4.0 in anal base; eye 2.0 to 2.8, usually 2.1 to 2.7 in anal base.....**Diapterus** Ranzani

3*b*. Sides of body with longitudinal black stripes; preorbital serrate except in young; second anal spine longer than anal base, its length 1.4 to 2.4, usually 1.5 to 2.3 in greatest depth of body; greatest depth of body 1.9 to 2.5, usually 2.0 to 2.4 in standard length; anal base 4.5 to 6.0, usually 4.6 to 5.9 in standard length; last dorsal spine 1.4 to 1.9 in anal base; eye 1.4 to 2.1, usually 1.5 to 2.0 in anal base.

Eugerres Jordan and Evermann

Genus EUCINOSTOMUS Baird and Girard

Eucinostomus Baird and Girard, *in* Baird, Rep. Smithsonian Inst. for 1854, p. 334, 1855. (Genotype, *Eucinostomus argenteus* Baird and Girard.) (Ref. copied.)

I am very grateful to Luis René Rivas for the identification of the specimens reported upon under this genus and for permission to print his key to the West Indian species of *Eucinostomus*.

1*a*. Anterior interhaemal bone funnel-shaped; maxillary longer than second anal spine, about equal to or greater than diameter of eye, about equal to or greater than least depth of caudal peduncle; second anal spine more than 2.6 in head, shorter than distance between tip of snout and center of eye; snout about equal to or longer than second anal spine; pectoral fin naked.

2*a*. Funnellike cavity in anterior interhaemal bone more conspicuous, about 4 times as long as wide, the lateral ridge low and not reaching to lowermost part of edge of funnel; anal rays III, 7; greatest depth of body 2.3 to 3.2, usually 2.4 to 3.1 in standard length.

3*a*. Gill rakers 7 on lower limb of first arch (not counting rudiments or gill raker at angle); maxillary more than 2.3 in distance between posterior tip of premaxillary process and origin of spinous dorsal fin, usually less than perpendicular distance between origin of spinous dorsal fin and

lateral line; posterior tip of premaxillary process not reaching to vertical from center of eye, its length (from tip to snout), 1.8 to 2.4 in distance between its posterior tip and origin of spinous dorsal fin; second anal spine shorter than diameter of eye, more than 3 in distance between posterior tip of premaxillary process and origin of spinous dorsal fin; spinous dorsal fin more or less dusky, but without a jet-black blotch at its tip, or definite whitish or colorless area below it.

4*a*. Greatest depth of body 2.3 to 2.6, usually 2.4 or 2.5 in standard length; head 2.8 to 3.1, usually 2.9 or 3.0 in standard length; the distance between tip of snout and origin of spinous dorsal fin, 2.1 to 2.3, usually 2.2 in standard length; eye 2.7 to 3.1, usually 2.8 to 3.0 in distance between origin of anal fin and caudal base; area over premaxillary processes usually crossed by scales anteriorly leaving a naked area behind.....**Eucinostomus gula** (Cuvier and Valenciennes)

4*b*. Greatest depth of body 2.8 to 3.3, usually 2.9 to 3.2 in standard length; head 3.1 to 3.5, usually 3.2 to 3.4 in standard length; the distance between tip of snout and origin of spinous dorsal fin, 2.3 to 2.5, usually 2.4 in standard length; eye 3.1 to 3.6, usually 3.2 to 3.5 in distance between origin of anal fin and caudal base; area over premaxillary processes usually depressed and narrowly U-shaped sometimes slightly restricted by scales anteriorly.

Eucinostomus argenteus Baird and Girard

3*b*. Gill rakers 8 on lower limb of first arch (not counting rudiments or gill raker at angle); maxillary less than 2.3 in distance between posterior tip of premaxillary process and origin of spinous dorsal fin, usually about equal to, or somewhat greater than perpendicular distance between origin of spinous dorsal fin and lateral line; posterior tip of premaxillary process reaching to or somewhat beyond vertical from center of eye, its length (from tip of snout) 1.3 to 1.8 in distance between its posterior tip and origin of spinous dorsal fin; second anal spine equal to or greater than diameter of eye, less than 3 in distance between posterior tip of premaxillary process and origin of spinous dorsal fin; spinous dorsal fin with a conspicuous jet-black blotch at its tip, separated from the basal dusky area by a whitish or colorless area.....**Eucinostomus pseudogula** Poey

2*b*. Funnellike cavity in anterior interhaemal bone less conspicuous, more than 4 times as long as wide, the lateral ridge high and reaching beyond lowermost part of edge of funnel; anal rays II, 8; greatest depth of body 3.1 to 3.5, usually 3.2 to 3.4 in standard length.

Eucinostomus lefroyi [19] (Goode)

1*b*. Anterior interhaemal bone spoon-shaped; maxillary shorter than second anal spine, less than diameter of eye, somewhat less than least depth of caudal peduncle; second anal spine less than 2.6 in head, usually about equal to, or slightly longer than distance between tip of snout and center of eye; snout shorter than second anal spine; pectoral fin scaled.

Eucinostomus havana [19] (Nichols)

EUCINOSTOMUS GULA (Cuvier and Valenciennes)

La Mojarra

Gerres gula Cuvier and Valencienes, Histoire naturelle des poissons, vol. 6, p. 464, 1830 (Martinique).

Eucinostomus gula Röhl, Fauna descriptiva de Venezuela, p. 407, 1942 (coast of Venezuela).

[19] Not yet reported from Venezuela.

U.S.N.M. No. 121705, 3 specimens, 47 to 70 mm., from Lago de Maracaibo at Yacht Club, Maracaibo, May 5 and 16, 1942.

U.S.N.M. No. 121706, 2 specimens, 36 and 53 mm., Lago de Maracaibo at Yacht Club, Maracaibo, February 27, 1942.

U.S.N.M. No. 121704, 1 specimen, 68 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121703, 14 specimens, 14 to 42 mm., Lago de Maracaibo opposite Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121707, 135 specimens, 28 to 77 mm., Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

The following collections were made by Dr. F. F. Bond:

10 specimens, 13 to 55 mm., coastal lagoons 15 km. north of Maracaibo April 6, 1938.

1 specimen, 53 mm., lagoons, Tucacas, 60 km. northwest of Puerto Cabello, January 29, 1938.

1 specimen, 29 mm., Río Borburata, 3 km. east of Puerto Cabello at Gañanga.

2 specimens, 20 and 23 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

EUCINOSTOMUS ARGENTEUS Baird and Girard

MOJARRA

Eucinostomus argenteus BAIRD AND GIRARD, *in* Baird, Ann. Rep. Smithsonian Inst. for 1854, p. 335, 1855 (Bessley Point, N. J.).

U.S.N.M. No. 121798, 62 specimens, 20 to 67 mm., Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

The following specimens were collected by the U. S. S. *Niagara* in Gulf of Venezuela:

U.S.N.M. No. 121943, 1 specimen, 80 mm. in standard length, Point Macolla, April 19, 1925.

U.S.N.M. No. 121945, 2 specimens, 81 and 87 mm. in standard length, Salinas Bay, April 4–5, 1925.

U.S.N.M. No. 121947, a specimen 89 mm., Estanques Bay, February 20, 1925.

U.S.N.M. No. 121944, 2 specimens, 56 and 67 mm., Amuay Bay, December 9, 1924.

U.S.N.M. No. 121946, 10 specimens, 45.5 to 80 mm., Cape San Román, April 2, 1925.

The following collections were made by Dr. F. F. Bond:

40 specimens, 15 to 27 mm. in standard length, Río Borburata, 3 km. east of Puerto Cabello at Gañanga, January 15, 1938.

9 specimens, 14 to 27 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

1 specimen, 19 mm., coastal lagoon 15 km. north of Maracaibo.

1 specimen, 21 mm., Río Apure at San Fernando de Apure, Feburary 16, 1938.

The young of this species and of *E. gula* are separated with considerable difficulty, and I am not positive that my identification of specimens under 25 mm. is correct.

In the Maracaibo Basin specimens, in addition to the difference in depth of body between *E. gula* and *E. argenteus*, I observed that the

tip of the lower jaw or lip was almost invariably without scattered black pigment in *argenteus*, whereas in *gula* the tip of the lip of lower jaw almost always had several black pigment cells somewhat embedded. The character of the area over the premaxillary process and scales meeting in front of this groove is of no value on small specimens. However, specimens from the coast of Venezuela south of the Gulf of Venezuela had their chins pigmented. Thus specimens 25 mm. and shorter can be separated only on their slenderness as compared with those of *gula* which are a little more robust.

EUCINOSTOMUS PSEUDOGULA Poey

Eucinostomus pseudogula Poey, Enumeratio piscium cubensium, p. 53, pl. 1, 1875 (Havana).

7 specimens, 34 to 47 mm., Laguna del Río Capatárida, 5 km. west of Capatárida, F. F. Bond, March 21, 1938.

Genus GERRES Cuvier

Gerres Cuvier, *in* Quoy and Gaimard, Freycinet, Voyage autour du monde, *L'Uranie* et *La Physicienne*, Poissons, p. 293, 1824. (Genotype, *Gerres vaigiensis* Quoy and Gaimard.) (Ref. copied.)

GERRES CINEREUS (Walbaum)

Mugil cinereus Walbaum, Artedi genera piscium, pt. 3, p. 228, 1792 (Bahamas) (ref. copied).

U.S.N.M. No. 121942, 1 specimen, 217 mm. in standard length, Gulf of Venezuela, U. S. S. *Niagara*, Feburary 20, 1925.

1 specimen, 65 mm., from lagoons at Tucacas, 10 km. northwest of Puerto Cabello, F. F. Bond, January 29, 1938.

2 specimens, 36 and 39 mm., Laguna del Río Capatárida at mouth, 5 km. north of Capatárida, F. F. Bond, March 21, 1938.

1 specimen, 47 mm., from baja seco east side of Puerto Cabello, January 26, 1938.

Genus DIAPTERUS Ranzani

Diapterus Ranzani, Novi Comment. Acad. Sci. Inst. Bonon., vol. 4, p. 340, 1840. (Genotype, *Diapterus auratus* Ranzani.)

It is with considerable reluctance that I add two new names to the genera *Diapterus* and *Eugerres* in my study of the Venezuelan forms. These genera have not been revised to my knowledge, and no one has as yet determined the constancy of the number of anal spines in large series of specimens. This should be done when the genera are revised, and then the validity of these new species as well as others may be evaluated. My counts, however, indicate a rather constant number of rays for most of the fins, and there appears to be little variation in the number of scales or gill rakers for any species from one locality.

The following key is based on specimens collected in Venezuelan waters, as well as on other materials in the national collections from the Western Atlantic:

1*a*. Anal rays III,8.

2*a*. Gill rakers on lower part of gill arch 10 or 11; dusky bars on sides of young but adults with dusky punctulations and no bars; second dorsal spine a little shorter than third, both shorter than head, the second contained nearly 4 times in standard length; second anal spine strong, but a little shorter than third, the second anal spine 1.8 in head and 1.5 in second dorsal spine; area over premaxillary groove free of scales in young but covered with small scales in large specimens.

Diapterus olisthostomus (Goode and Bean)

2*b*. Gill rakers on lower part of first arch 15; second dorsal spine a little shorter than third, the second spine about 1⅛ in head; second anal spine enlarged, a little longer than third spine, the second 1.5 in head and 1⅓ in second dorsal spine; second row of scales below lateral line continuous to end of caudal; area over premaxilary processes on top of head free from scales; no dark stripes or distinct bars visible.

Diapterus limnaeus, new species

1*b*. Anal rays II,i,8 or II,9.

3*a*. Anal rays II,9; gill rakers on lower part of first arch 14 or 15, rarely 16; second dorsal spine a little shorter than third, the second spine contained 1.2 to 1.4 in head and about 3.2 to 3.5 in standard length; second anal spine 1.4 to 1.6 in head and 4 to 4.5 in standard length; second row of scales below lateral line continuous to caudal fin.

Diapterus rhombeus (Cuvier)

3*b*. Anal rays II,i,8: gill rakers 10 or 11 on lower part of first arch; second dorsal spine a little shorter than third, about 1⅛ to 1⅓ in head and 3.5 to 3.75 in standard length; second anal spine strong, 1.6 in head and 4.2 in standard length; third row of scales below lateral line continuous to caudal.....**Diapterus evermanni** Meek and Hildebrand

DIAPTERUS OLISTHOSTOMUS (Goode and Bean)

Gerres olisthostoma Goode and Bean, Proc. U. S. Nat. Mus., vol. 5, p. 423, 1882 (Indian River, Fla.).

U.S.N.M. No. 121941, 1 specimen, 177 mm. in standard length, Amuay Bay, Gulf of Venezuela, U. S. S. *Niagara*, May 15, 1925.

DIAPTERUS LIMNAEUS, new species

Figure 16

Holotype.—U.S.N.M. No. 121726, only known specimen, 68 mm. in standard length, collected by Leonard P. Schultz in Lago de Maracaibo at Maracaibo Yacht Club, May 16, 1942.

Description.—Certain measurements were made on the holotype and these are recorded in hundredths of the standard length in table 18.

The following counts were made: Dorsal rays IX,10; anal rays III,8; pectoral rays iii,12-iii,12; scales from upper edge of gill opening to midcaudal fin base 40; scales from base of first soft ray of dorsal to lateral line 4, and 9 from base of first anal spine to lateral line; gill rakers on lower part of first arch 15.

Greatest depth of body 2.2 and head 3, in standard length; snout 3.25, eye about 2⅔, and postorbital length of head 2⅓ in length of

head; maxillary reaches to below anterior margin of pupil; area above premaxillary processes broad and free from scales; preorbital edge smooth; posterior margin of preopercle serrate; gill rakers short, strong, on lower part of first arch; second dorsal spine not reaching quite to tip of third; second anal spine strong, reaching past third which is slender; second dorsal spine 1.1 and second anal spine about 1.4 in head; distal margin of dorsal fin concave, that of anal fin a little concave; pectoral fin pointed, the second branched ray longest, and reaching opposite base of third anal spine; third dorsal spine when depressed reaches to opposite base of fourth soft dorsal ray; second anal spine when depressed reaches past base of last anal ray;

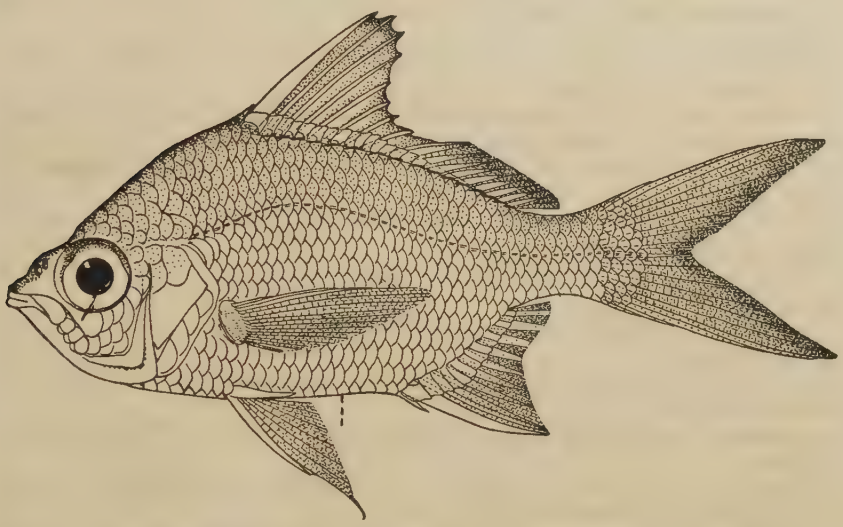

FIGURE 16.—*Diapterus limnaeus*, new species: Holotype (U.S.N.M. No. 121726), 68 mm. in standard length. Drawn by Mrs. Aime M. Awl.

profile of head slightly concave over eyes; first soft ray of pelvics with a short filament, the pelvic spine reaching nearly past anus; second row of scales below lateral line continuous to caudal fin base; greatest depth of body at origin of dorsal fin.

Color.—Plain silvery without dark streaks on sides and no dark bars; distal margin of dorsal fin black edged; a few blackish pigment cells on interradial membranes of dorsal and anal fins but not forming spots or blotches; tips of rays of caudal fin with a few dark pigment cells.

Remarks.—This new species differs from all others of the genus in the Atlantic as indicated in the key on pages 141 and 142, chiefly in having 15 gill rakers in combination with a smooth preorbital, no scales on area over premaxillary groove, and the second dorsal

spine not reaching quite to tip of third dorsal spine. From *D. peruvianus* of the Pacific with which this new species is most closely related, it differs by having 15 gill rakers instead of 12 or 13.

Named *limnaeus* (meaning "lake") in reference to its occurrence in Lake Maracaibo.

DIAPTERUS RHOMBEUS (Cuvier)

La Carpeta

Gerres rhombeus Cuvier, La règne animal, vol. 2, ed. 2, p. 188, 1829.

U.S.N.M. No. 121710, 5 specimens, 56.5 to 83 mm. in standard length, from Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 121713, 2 specimens, one 67 mm., the other only anterior part of body and head, Lago de Maracaibo, 1 km. off Pueblo Viejo in gill net, April 7–9, 1942.

U.S.N.M. No. 121712, 5 specimens, 35 to 59 mm., Lago de Maracaibo at Yacht Club, Maracaibo, February 27, 1942.

U.S.N.M. No. 121711, 3 specimens, 43 to 64 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

U.S.N.M. No. 121708, 29 specimens, 36 to 62 mm., Lago de Maracaibo at Yacht Club, Maracaibo, March 5, 1942.

U.S.N.M. No. 121714, 12 specimens, 28 to 43 mm., Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121709, 1 specimen, 20 mm., caño at Los Monitos, Río Limón system, March 11, 1942.

U.S.N.M. No. 121949, 1 specimen, 36 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

U.S.N.M. No. 121948, 6 specimens, 35 to 39 mm., Amuay Bay, U. S. S. *Niagara*, December 9, 1924.

1 specimen, 25 mm., bajo seco east side of Puerto Cabello, F. F. Bond, January 26, 1938.

3 specimens, 40 to 42 mm., Laguna del Río Capatárida at mouth, 5 km. north of Capatárida, F. F. Bond, March 21, 1938.

1 specimen, 22 mm., Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

DIAPTERUS EVERMANNI Meek and Hildebrand

Diapterus evermanni Meek and Hilderrand, The marine fishes of Panama, pt. 2, p. 594, pl. 63, 1925 (Mindi River, near Mindi; Fox Bay, Colon, Panama).

3 specimens, 40 to 44.5 mm., Laguna del Río Capatárida at mouth, 5 km. north of Capatárida, F. F. Bond, March 21, 1938.

3 specimens, 47 to 53.5 mm., Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

2 specimens, 54 and 55. 5 mm., salt-water lagoon on coast, 5 km. west of Cumaná, F. F. Bond, March 25, 1939.

The three collections listed above contain eight specimens in which the anal rays are II,i,8. The type and paratype of *evermanni*, U.S.N.M. Nos. 81738 and 81322, have II,i,8 rays, the third ray simple and with its tip cross striated, indicating that this is a soft ray but unbranched. This species is the counterpart of the four

TABLE 17.—*Counts made on species of* Diapterus *and* Eugerres

Genus and species	Number of fin rays															Number of gill rakers on lower part of first arch						
	Dorsal					Anal							Pectoral										
	VIII, 11	IX, 9	IX, 10	IX, 11	X, 10	II, i, 7	II, i, 8	II, 8	II, 9	III, 7	III, 8	III, 9	iii, 12	iii, 13	iii, 14	iv, 12	10	11	12	13	14	15	16
Diapterus:																							
olisthostomus			1								1			2			1						
limnaeus			1								1		2									2	
rhombeus			19						35				2	11		3						13	1
erermanni			8	1	1		10						1	2	2		1	7	3				
Eugerres:																							
awlae		1	4					1	4					3	1						2	2	
brasilianus			2							2			1	2			2						
plumieri	1	1	13			1	3			1	13	1	2	12		1					8	4	

specimens mentioned under *plumieri* that have the third anal ray simple but cross striated.

This modification of the third anal ray has been considered by Meek and Hildebrand as of specific significance, but its occurrence in other species causes me to cast serious doubt on its validity as a dependable character when considered alone. However, in view of the small series of specimens for certain species of *Diapterus*, I am tentatively referring the above listed specimens to *evermanni*.

TABLE 18.—*Measurements made on certain species of* Diapterus. (*All measurements expressed in hundredths of the standard length.*)

Characters	*D. limnaeus*	*E. awlae*		*E. plumieri*	
	Holotype	Holotype	Paratype	U.S.N.M. No. 121725	
Standard length in millimeters	68	75	79	45.7	43.5
Length of head	33.8	36.6	35.4	37.2	37.2
Postorbital length of head	14.3	15.7	15.2	15.1	15.4
Diameter of eye	12.8	14.0	12.7	13.6	15.4
Length of snout	10.3	10.0	10.1	10.1	11.3
Tip of snout to rear of maxillary	12.1	13.1	12.0	12.9	13.3
Width of bony interorbital space	9.56	9.34	8.98	8.75	8.96
Greatest depth of body	44.1	44.7	43.9	39.4	37.9
Least depth of caudal peduncle	16.5	19.6	19.7	19.7	18.8
Length of:					
Caudal peduncle	12.5	12.0	11.9	11.6	11.5
Longest ray of pectoral	33.8	34.0	33.2	28.9	29.0
Longest branched ray of pelvic fins	27.9	30.7	27.0	27.8	28.7
Longest branched ray of caudal fin	40.4	40.0	41.8	37.6	37.9
Second dorsal spine	30.1	44.8	40.6	39.4	39.5
Third dorsal spine	30.1	40.1	35.4	32.8	35.6
Second anal spine	22.8	36.7	37.3	33.9	34.5
Third anal spine	20.0	----	----	----	----
Tip of snout to:					
Dorsal origin	45.6	48.0	47.4	45.3	45.5
Anal origin	67.6	68.0	66.4	66.0	65.3
Pectoral insertion	33.8	36.0	35.4	35.4	37.7
Pelvic insertion	41.8	40.8	41.0	42.4	43.6
Length of:					
Base of dorsal fin	49.2	51.3	51.3	47.0	49.2
Base of anal fin	23.5	20.0	22.1	20.8	19.5
Pelvix spine	18.7	20.3	19.7	18.6	17.7
Pelvic axillary scale	10.3	11.1	7.59	8.30	8.28

Genus EUGERRES Jordan and Evermann

Eugerras JORDAN AND EVERMANN, Proc. California Acad. Sci., ser. 4., vol. 16, p. 506, 1927. (Genotype, *Gerres plumieri* Cuvier and Valenciennes.)

1*a*. Gill rakers on lower part of first arch usually 10; anal rays III,7; second dorsal spine a little shorter than head but a trifle longer than third dorsal spine and about 3.5 in standard length; second anal spine equal to second dorsal spine in length.....**Eugerres brasilianus** [20] (Cuvier and Valenciennes)

1*b*. Gill rakers on lower part of first gill arch usually 14 to 16; second dorsal spine longer than third and longer than head, about 2⅓ in standard length;

[20] Not yet reported from Venezuela.

second anal spine about 1 to 1.1 in head, and 2.75 to 3 in standard length; young with 4 to 7 narrow vertical dusky bars on sides.

2*a*. Anal rays II,8 or 9 ..... **Eugerres awlae**, new species

2*b*. Anal rays II,i,7 or 8 or III,7 to 9.

Eugerres plumieri (Cuvier and Valenciennes)

EUGERRES AWLAE, new species

FIGURE 17

Holotype.—U.S.N.M. No. 121721, a specimen, 74 mm. in standard length, collected by Leonard P. Schultz in the channel of Salina Rica, 5 km. north of Maracaibo, Venezuela, February 20, 1942.

Paratypes.—U.S.N.M. No. 121722, 3 specimens, 37 to 79 mm., taken by Leonard P. Schultz in Lago de Maracaibo opposite Salina Rica, 5 km. north of Maracaibo, February 20, 1942; U.S.N.M. No. 121723, a specimen, 57 mm., collected in Lago de Maracaibo, 7 km. south of Maracaibo, by Leonard P. Schultz on March 6, 1942.

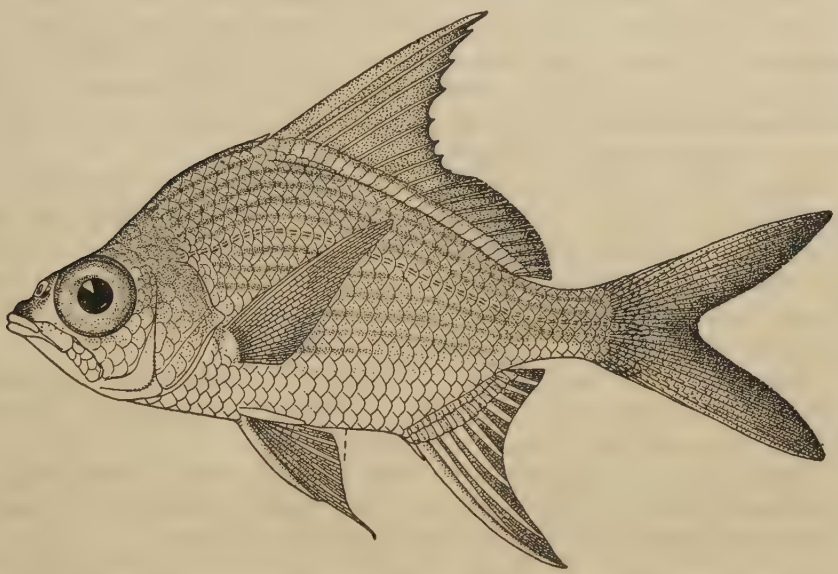

FIGURE 17.—*Eugerres awlae*, new species: Holotype (U.S.N.M. No. 121721), 74 mm. in standard length. Drawn by Mrs. Aime M. Awl.

Description.—Certain measurements were made on the holotype and one paratype and these data are recorded in table 18, expressed in hundredths of the standard length.

The following counts were made, respectively, for the holotype and one paratype, and additional counts are recorded in table 17: Dorsal rays IX,10 (IX,10); anal rays II,9 (II,9); pectoral rays iii,13-iii,13 (iii,13-iii,13); scales 37 (37); scales above lateral line to base of first soft ray of dorsal 4 (4) and below lateral line to origin of anal fin 9

(9); gill rakers on lower half of arch 14 to 15, the most anterior tiny rudiment or two not included.

Greatest depth of body 2.3 to 2.5, head about 2.6 or 2.7 in standard length; snout 3.5 to 3.7, eye 2.7 or 2.8 and postorbital length of head 2.3 or 2.4, all in length of head; maxillary reaches to below anterior margin of pupil; area above premaxillary processes broad and without scales; preorbital edge smooth in young or a little rough or somewhat serrate in adults; rear margin of preopercle serrate; gill rakers strong and short; second dorsal spine long, reaching past third, contained 2.4 to 2.6 in standard length, much longer than length of head, about equal to greatest depth of body; second anal spine long, strong, equals length of head or nearly so; distal margin of dorsal and of anal fins strongly concave; pectoral fin long, pointed, the third branched ray usually longest, reaching to opposite base of first or second soft anal rays; second dorsal spine when depressed reaches to opposite bases of seventh or eighth soft dorsal rays; second anal spine reaches to opposite caudal fin base or a little beyond in the large specimens; profile of head slightly concave over orbits; first soft ray of pelvics with a short filament, the pelvic spine shorter but reaching a little past anus; third row of scales below lateral line continuous to caudal fin; greatest depth of body at origin of dorsal.

Color.—Each row of scales with a dark streak dorsally, but more or less lacking ventrally; margin of dorsal fin blackish distally, rest of fin dusky, except the sheath of scales along the base are white; anal fin dusky, basal sheath of scales white; pelvic fins and caudal fin dusky; pectoral fins pale; top of snout dusky, but lips are white except some black pigment on middorsal part of upper lip.

Remarks.—This new species is separated from other western Atlantic representatives of the genus by the key on page 146. Other minor differences are given in tables 17 and 18.

Named *awlae*, in honor of Mrs. Aime M. Awl, artist, United States National Museum, who has willingly and expertly drawn for me very numerous figures of new fishes over a period of years.

EUGERRES PLUMIERI (Cuvier and Valenciennes)

La Mojarra

Gerres plumieri Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 6, p. 452, pl. 167, 1830 (Puerto Rico; Antilles).

U.S.N.M. No. 121720, 7 specimens, 63 to 85 mm. in standard length, from Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121719, a specimen, 123 mm., from Lago de Maracaibo near mouth of Río Concha, May 2, 1942.

U.S.N.M. No. 121717, 5 specimens, 55 to 87 mm., from Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121716, 4 specimens, 53 to 82 mm., from Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 121715, 10 specimens, 33 to 50 mm., from Lago de Maracaibo at Yacht Club, Maracaibo, February 27, 1942.

U.S.N.M. No. 121718, 6 specimens, 45 to 100 mm., Lago de Maracaibo at Yacht Club, Maracaibo, March 5, 1942.

There are four specimens measuring 37.5 to 51 mm., from Lago de Maracaibo at Yacht Club, Maracaibo, that I have separated from the February 27 collection (U.S.N.M. No. 121715) and I have placed them in a separate jar that bears U.S.N.M. No. 121725. They are referred to this species but vary from it in having II, i, 7 (in one specimen) and II, i, 8 (in three specimens) instead of the usual three anal spines. The third anal ray is usually a small slender spine but in the four specimens under consideration here the third ray is simple with a few cross-striations near its tip. I cannot otherwise distinguish these four specimens from typical specimens of *D. plumieri*.

Should a larger series become available to someone and should these prove to represent an undescribed species, I have carefully measured two specimens and recorded the data in table 18. In addition, the following description was drawn up.

Dorsal rays VIII, 11 (in one) and IX, 10 (in three); pectoral rays IV, 12 in two counts, V, 11 in three, V, 12 in one; gill rakers on lower part of first gill arch 14 or 15 in all four specimens.

Greatest depth of body 2.5 or 2.6, head 2.7 or 2.8 in standard length; snout 3.2 to 3.5, eye 3.6 to 3.8, and postorbital length of head 2.3 or 2.4, all in length of head; maxillary reaches not quite to below anterior margin of pupil; area above premaxillary groove naked; preorbital edge smooth or slightly rough; rear margin of preopercle serrate; gill rakers strong and short; second dorsal spine long, reaching past third dorsal spine and longer than head, contained 2.5 or 2.6 in standard length and equal to or a little longer than greatest depth of body; second anal spine long and strong, a trifle shorter than head, about three times in standard length; distal margins of dorsal and of anal fins concave; pectoral fins long, pointed, the first or second branched rays longest and reaching to opposite origin of anal fin; second dorsal spine when depressed reaches to opposite bases of seventh or eighth soft dorsal rays; second anal spine when depressed reaches to caudal fin base or nearly to it; profile of head barely concave over orbits; first soft pelvic ray with a filament, the pelvic spine shorter but reaching a little past anus; third row of scales below lateral line continuous to caudal, rarely the second row; greatest depth of body at origin of dorsal fin.

Color.—Each row of scales has a darkly pigmented area giving the appearance of streaks of small spots along each row of scales along upper sides; distal margin of dorsal fin blackish, and rest of fin dusky, except the basal sheath of scales, which are white; caudal fin dusky; anal dusky forward; pectorals pale; snout dusky and dorsal tip of

upper lip dusky, rest of upper and lower lips white; these young specimens have 4 to 7, usually about 5, narrow vertical dusky bars on sides.

In addition, I refer to this species a small specimen, 17 mm. in standard length, collected April 6, 1938, by Dr. F. F. Bond in a coastal lagoon 15 km. north of Maracaibo.

Family SCIAENIDAE: Croakers; Corvinas

During my study of this family I carefully dissected the skin and scales from the dorsal and lateral surfaces of the head for the purpose of determining which genera have "cavernous skulls" and found that all of the genera listed herein have the narrow bony bridges and sunken spaces, otherwise called cavernous skulls. In those genera and species with broad interorbital spaces similar to *Stellifer* and with thinner skin or scales the caverns are more easily felt by touch than in certain other genera such as *Equetus*.

The counting of the number of scale rows above the lateral line is subject to error since certain rows run together as they approach the lateral line. To avoid this error and keep my counts consistent, I counted the rows directly above the lateral line.

KEY TO THE SCIAENIDAE REPORTED FROM VENEZUELA

1*a*. Tip of chin with a short stubby barbel, or each side of lower jaw anteriorly with a row of minute barbels; width of preorbital wider than eye diameter; scales along lateral line not enlarged; lower jaw included, teeth in villiform band; teeth in upper jaw in a villiform band, outer row a little enlarged.

2*a*. Tip of chin with a short, stout, blunt barbel; gill rakers on first arch very short or almost rudimentary.

3*a*. Anal with one weak or nonpungent spine; preopercular edge not serrate but its edge rather firm; first soft ray of pelvic fin not ending in a filamentous tip; dorsal rays X–I,23 to 25; anal rays I,7; pectoral rays 22 or 23; scale rows 74 to 82.

Menticirrhus martinicensis Cuvier and Valenciennes

3*b*. The two anal spines pungent; preopercular edge finely serrate; tip of first soft pelvic ray more or less ending in a short filament.

4*a*. Vertical scale rows above lateral line 57 and 58 (in two counts); dorsal rays X–I,26 to 28; barbel blunt.

Umbrina coroides Cuvier and Valenciennes

4*b*. Vertical scale rows 48; dorsal rays X–I, 22; barbel tapering to a point.

Umbrina gracilicirrhus Metzelaar

2*b*. Each side of middle of lower jaw anteriorly with a short row of fine barbels; gill rakers of moderate length, well developed on first arch; two pungent anal spines; first soft pelvic ray with a short filamentous tip; dorsal rays X–I,26 or 27; anal rays II,8; pectoral rays 18 or 19; gill rakers 7 or 8 + 13 to 15; scale rows about 68 to 70__**Micropogon furnieri** (Desmarest)

1*b*. No barbels at tip of chin or on lower jaw.

5*a*. Scales along the lateral line enlarged, partly overlapped by adjoining smaller scales; mouth terminal, sometimes oblique in position; two pungent anal spines; scale rows below lateral line slanting obliquely

upward to lateral line, not parallel with it on caudal peduncle; lower jaw nearly equal to upper, with two irregular rows of teeth, inner row enlarged some more or less caninelike; upper jaw with a narrow villiform band of teeth, with outer row enlarged, more or less small canines; gill rakers moderately long; maxillary reaching well under or past eye; preorbital usually wider than eye---------- **Plagioscion** Gill

5*b*. Scales along the lateral line of about same size as adjoining scales.

6*a*. Preopercular edge with one or more projecting sharp spines; 2 pungent anal spines.

7*a*. Anal rays II,8; teeth in upper jaw in a villiform band with outer row a little enlarged.

8*a*. Lower jaw included, with the villiform teeth in a wide band, none of which is enlarged; mouth inferior, scarcely oblique; gill rakers short to moderately long, 9 or 10 + 1 + 16 to 18; first soft ray of pelvic fins ending in a short filament; dorsal rays XI,I (rarely XII,I) 21 or 22; anal rays II,8; pectoral rays ii,16 or ii,17; scale rows 52 to 54---------- **Ophioscion venezuelae** Schultz

8*b*. Lower jaw a little included, with a narrow band of villiform teeth, the inner row of which is a trifle enlarged; mouth nearly terminal, oblique; gill rakers long and slender, 19 or 20 + 1 + 28 to 30; first soft ray of pelvic fin ending in a short filament; dorsal rays XI, I, or XII,I,21 to 24; anal rays II,8; pectoral rays about 20; scale rows about 50 or 51. (See fig. 19)-- **Stellifer rastrifer** (Jordan)

8*c*. Lower jaw oblique, equals upper jaw or nearly so, with the minute teeth in a narrow band of 2 or 3 rows forward and in a single row of slightly enlarged teeth posteriorly; gill rakers moderately long, 9 or 10 + 1 + 15 or 16; first soft ray of pelvic fin not ending in a filament; dorsal rays X,I,23 to 25; anal rays II,8; pectoral rays about 17; scale rows about 55 or 56. (See fig. 19.)

Bairdiella ronchus (Cuvier and Valenciennes)

7*b*. Anal rays II,6; lower jaw included, snout projecting a little in front of the premaxillary, the maxillary not quite reaching to under front of eye; teeth in both jaws minute, in villiform bands, none enlarged; preopercular edge with several short spines; gill rakers rather short, 5 or 6 + 1 + 10 or 11 on first gill arch; dorsal rays X,I,24 to 29, usually 25 to 27; pectoral rays 16 to 18; vertical scale rows above lateral line 81 to 87---------- **Pachyurus schomburgkii** Günther

6*b*. Preopercular edge membranous, without pungent spines or with the edge rather hard and finely serrate, but without projecting spines (except in young about 35 mm. and shorter); preorbital usually narrower than eye.

9*a*. Anal spines minute or nonpungent or flexible; upper jaw with canine teeth; lower jaw longer than upper, entering or nearly entering profile.

10*a*. Upper jaw with a pair or so of lance-shaped teeth, the tips flattened, with cutting edges; canine teeth present in lower jaw in a single row; first soft ray of pelvic fin not ending in a filamentous tip, dorsal rays X,I,28; anal II,9; gill rakers 3 + 1 + 9; scale rows 120; pectoral 16 (counts made on one specimen).

Macrodon ancylodon Bloch and Schneider

10*b*. Upper jaw with a pair or so of round conical pointed teeth, and other teeth enlarged, and in a narrow band; teeth of lower jaw in a narrow band with outer and inner teeth enlarged and with

some villiform teeth between the enlarged ones forward; gill rakers moderately short; first soft pelvic ray without filamentous tip_**Cynoscion** Gill (see key to species on p. 150).

9*b*. Two pungent anal spines.

11*a*. First or spiny dorsal fin with second to sixth spines short as length of head, not filamentous.

12*a*. Teeth of upper jaw in a villiform band with outer row enlarged; lower jaw with single row of teeth; lower jaw slightly longer than upper but not entering profile; first soft ray of pelvic fin without filamentous tip; dorsal rays X–I,23 to 25; anal rays II,9; gill rakers 8 or 9 + 1 + 17 or 18; scale rows about 50 to 52_____**Corvula sanctae-luciae** Jordan

12*b*. Teeth of upper jaw very small in one row with 2 or 3 rows posteriorly; lower jaw very oblique, tip of chin projecting, not quite entering profile; teeth of lower jaw small in a single row; first soft ray of pelvic fin with a short filamentous tip; body compressed; dorsal rays X–I,27 to 31; anal rays II,6; gill rakers about 9 or 10 + 1 + 18 to 20; scale rows about 48 49_____**Larimus breviceps** Cuvier and Valenciennes

11*b*. Second to sixth dorsal spines long, filamentous, at least 1½ times length of head and when fin is depressed reaching to middle of base of soft dorsal fin; a broad brownish band bordered by a pale band from base of spiny dorsal fin curves downward behind pectoral fin thence posteriorly along midaxis of body, two other dark bands separated by pale ones occur on head, one behind eye and the other through front of eye; median fins pale spotted; dorsal rays about XIII–47 to 50; anal II,7.

Equetus punctatus Bloch

Genus MENTICIRRHUS Gill

Menticirrhus Gill, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 86. (Genotype, *Perca alburnus* Linnaeus=*Cyprinus americanus* Linnaeus.)

MENTICIRRHUS MARTINICENSIS (Cuvier and Valenciennes)

Umbrina martinicensis Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 186, 1830 (Martinique).

U.S.N.M. No. 128252, 1 specimen, 47 mm. in standard length, from Point Macolla, U. S. S. *Niagara*, April 19, 1925.

U.S.N.M. No. 128253, 1 specimen, 46 mm., southern coast of the Gulf of Venezuela, U. S. S. *Niagara*, November 15, 1925.

U.S.N.M. No. 128254, 3 specimens, 179 to 295 mm., Estanques Bay, U. S. S. *Niagara*, December 8 and 12, 1924.

The following counts were made on the above listed specimens:

Dorsal rays X-I,23; X-I,25; X-I,24; X-I,24; X-I,23; anal rays I,7; I,7; I,7; I,7; I,7; pectoral rays —; 23; 22; 22; 22; scales —; 74; 75; 82; 79; usually 6 or 7 scales from lateral line to front of soft dorsal and 11 or 12 to anal origin; gill rakers about 3 or 4 + 5 to 8 counting rudiments; about 50 pores in the lateral line.

Genus UMBRINA Cuvier

Umbrina Cuvier, Le règne animal, ed. 1, vol. 2, p. 297, 1817. (Genotype, *Sciaena cirrhosa* Linnaeus.)

UMBRINA COROIDES Cuvier and Valenciennes

Umbrina coroides Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 187, 1830 (Brazil).

U.S.N.M. No. 128259, 1 specimen, 265 mm. in standard length, from Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

The following counts were made on the above listed specimen. Dorsal rays X-I,26; anal rays II,7; vertical scale rows 57 above lateral line, 5½ from lateral line to base of first soft dorsal ray, and 10 from lateral line to anal origin.

UMBRINA GRACILICIRRHUS Metzelaar

Umbrina gracilicirrhus Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 72, fig. 24, 1919 (coast of Venezuela).

Genus MICROPOGON Cuvier and Valenciennes

Micropogon Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 215, 1830. (Genotype, *Micropogon lineatus* Cuvier and Valenciennes= *Perca undulata* Linnaeus.)

MICROPOGON FURNIERI (Desmarest)

Umbrina furnieri Desmarest, Première décade ichthylogique—Cuba, p. 22, pl. 2, fig. 3, 1823 (Havana) (ref. copied).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 71, 1919 (Carupana, Venezuela).

U.S.N.M. No. 121748, 2 specimens, 108 and 114 mm., Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 121747, 1 specimen, mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

The following collections were made by the U. S. S. *Niagara:*

U.S.N.M. No. 128247, 1 specimen, 310 mm. in standard length, Piedras Bay, Gulf of Venezuela, March 14, 1925.

U.S.N.M. No. 128246, 1 specimen, 213 mm., Gulf of Venezuela, 1924–25.

The following counts were made: Dorsal rays X–I, 26 in 4 specimens and X–I, 27 in one; anal rays II, 8 in 5 specimens; pectoral rays 19; 18; 18; gill rakers on first gill arch 7+14; 8+15; 8+13; and 7+13; vertical scale rows above lateral line 68 and 70; 7 or 8 scales from lateral line to base of soft first dorsal ray and 7 to 9 from lateral line to anal origin.

Genus PLAGIOSCION Gill

Plagioscion Gill, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 82. (Genotype, *Sciaena squamosissima* Heckel.)

Since I have no specimens from Venezuela I hesitate to make a key. Steindachner (1917b) reviews eight species of this genus, in-

cluding those recorded below from Venezuela, and his contribution should be consulted for the identification of specimens.

PLAGIOSCION SQUAMOSISSIMUS (Heckel)

CORVINA O CORVINATA

Sciaena squamosissimus HECKEL, Ann. Wein. Mus. Naturg., vol. 2, p. 438, pl. 30, figs. 26–28 (scales), 1840 (Río Negro; Río Branco).

Plagioscion squamosissimus STEINDACHNER, Denkschr. Akad. Wiss. Wien, vol. 41, p. 151, 1879 (Río Negro; Ciudad Bolívar, Venezuela); Sitzb. Akad. Wiss. Wien, vol. 126, p. 663, pl. 1, fig. 2, pl. 2, fig. 1, 1917 (Río Negro; Ciudad Bolívar on Río Orinoco).

Sciaena amazonica PETERS, Monatsb. Akad. Wiss. Berlin, 1877, p. 469 (Calabozo, Venezuela).—SACHS, Aus den Llanos, 1879, p. 226 (Calabozo).—REGAN, Proc. Zool. Soc. London, 1905, pt. 1, p. 190 (Río Negro).—RÖHL, Fauna descriptiva de Venezuela, p. 407, 1942 (Orinoco).

PLAGIOSCION AURATUM (Castelnau)

Johnius auratus CASTELNAU, Animaux nouveaux ou rares recueilles dans les parties centrales de l'Amérique de Sud, vol. 2, pt. 7. Poissons, p. 12, pl. 4, fig. 2, 1855 (Ucayala).

Plagioscion auratum EIGENMANN AND ALLEN, Fishes of western South America, p. 387, 1942 (Apure River).

Genus OPHIOSCION Gill

Ophioscion GILL, Proc. Acad. Nat. Sci. Philadelphia, 1863, p. 165. (Genotype, *Ophioscion typicus* Gill, U. S. N. M. No. 22861, west coast of Panama.)

OPHIOSCION VENEZUELAE Schultz

FIGURE 18

Ophioscion venezuelae SCHULTZ, Proc. U. S. Nat. Mus., vol. 96, p. 131, fig. 7, 1945 (Caño de Sagua, 25 km. north of Sinamaica, Venezuela).

The following types were collected by Leonard P. Schultz in Venezuela during 1942: Holotype, U.S.N.M. No. 121749, and 6 paratypes, U.S.N.M. No. 121750, all from south of Caño de Sagua about 25 km. north of Sinamaica, May 12.

Description.—Certain measurements were made, and these data, recorded below, are expressed in hundredths of the standard length, first for the holotype and then for three paratypes in parentheses, respectively. Standard lengths in millimeters, 139.5 (68.8; 150; 139).

Length of head 28.6 (30.5; 32.4; 30.2); greatest depth of body 30.1 (27.0; 31.2; 30.9); diameter of eye 6.24 (7.12; 5.93; 6.11); length of snout 8.74 (8.14; 9.34; 8.63); distance from tip of snout to rear edge of maxillaries 13.1 (12.6; 13.0; 13.2); least width of preorbital 3.65 (3.63; 4.13; 39.5); postorbital length of head 18.0 (15.8; 17.9; 18.5); width of bony interorbital space 9.68 (9.16; 9.66; 10.3); length of caudal peduncle 25.1 (25.1; 24.3; 25.4); least depth of caudal peduncle 10.7 (9.88; 10.9; 10.9); length of base of second dorsal fin 32.6 (32.5; 32.1;

32.4); length of base of anal fin 11.0 (11.6; 11.7; 11.2); length of longest dorsal spine 18.6 (21.1; 18.5; 19.3); length of longest soft dorsal ray— (13.1; —; 13.2); longest soft anal ray 16.1 (17.0; —; 14.7); length of second anal spine 16.3 (17.4; —; 15.8); longest pectoral fin ray 25.2 (23.1; 22.7; 25.2); longest soft pelvic ray 13.0 (18.6; 12.3; 13.9); length of pelvic spine 9.32 (11.5; 8.34; 8.85); longest or middle

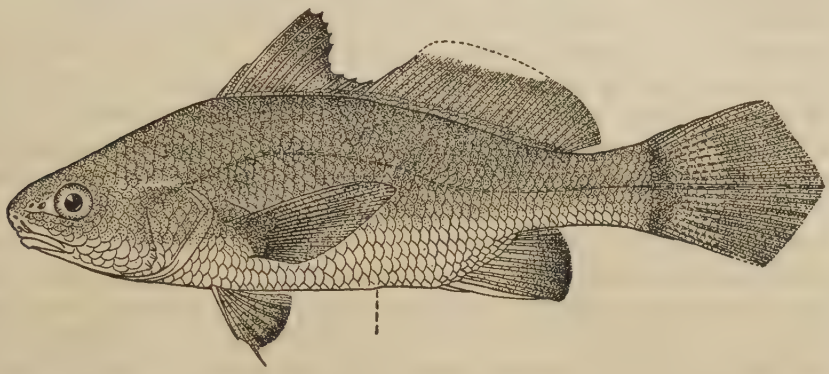

FIGURE 18.—*Ophioscion venezuelae* Schultz: Holotype (U.S.N.M. No. 121749), 139.5 mm. in standard length. Drawn by Mrs. Aime M. Awl.

caudal fin rays 25.9 (26.9; 22.7; 25.5); distance from tip of snout to dorsal origin 37.1 (35.9; 38.5; 37.7); snout to anal origin 67.2 (65.4; 65.1; 66.2); snout to pectoral insertion 32.6 (31.1; 32.2; 31.6); snout to pelvic insertion 32.6 (30.5; 30.6; 30.9); length of longest gill rakers on first gill arch 1.58 (2.76; 1.66; 3.22).

The following counts were made, respectively: Dorsal rays XI–I, 21 (XI–I,22; XII–I,21; XI–I,21; XI–I,21; XI–I,21; XI–I,22); anal rays on all types II,8; pectoral rays ii, 17–ii, 17 (ii,16; ii,17–ii,17; ii,17–ii,17; ii,16); pelvics always I,5; number of vertical scale rows above lateral line 52 (53; 52; 54); scales from dorsal origin to lateral line 6 (—; 6; 6) and from base of first soft dorsal ray to lateral line 6 (—; 6; 6); scales from lateral line to anal origin 8 (—; 8; 8); scales in a zigzag row around the caudal peduncle 19 (—; 19; 19); number of gill rakers on first gill arch 9+1+16 (—; 10+1+18; 10+1+18; 9+1+16; 10+1+16).

Head depressed forward but rounded dorsally, the interorbital space convex, broad, about equal to the snout; body compressed; anterior profile nearly straight but the dorsal contour curved, the ventral contour but slightly curved backward to anus; back highest at base of spiny dorsal fin; eye about 2⅔ in postorbital length of head, 1.8 in interorbital space; posterior nasal opening rounded, slightly larger than the anterior one; tip of lower jaw without barbels; anal origin

equidistant between pelvic insertion and midcaudal fin base; pelvic fins reaching halfway to anus, the first soft ray ending in a short filament; preopercle with eight or nine short spines, the lowest one strongest but not hooked downward; caudal peduncle least depth 2⅓ in its length; tips of pectoral fins reaching a trifle past anus; teeth in jaws in bands, the outer row of upper jaw a little enlarged; pseudobranchiae well developed; gill rakers short, not quite so long as pupil diameter; scales strongly ctenoid; lateral line curved over pectoral fin, then running a straight course on caudal peduncle along its midaxis; fourth scale row below lateral line, anteriorly, the first one extending to base of caudal fin; first dorsal spine rudimentary, second 2.5 in third, the latter nearly as long as the fourth; second and eighth to eleventh and the next spine heavier than the third to seventh spines of dorsal fin; fourth or longest dorsal spine about equal to postorbital length of head; distal margin of spiny dorsal fin truncate or a very little concave, that of soft dorsal probably a trifle rounded (the tips of the soft rays are lacking and this cannot be determined accurately); middle rays of caudal fin longest, edges of lobes more or less truncate to rounded (double truncate); distal margins of anal and pelvic fins a little rounded; pectoral fins somewhat pointed, the fourth branched ray from above longest.

Color.—In alcohol the upper sides and back are grayish brown, white below; dorsal, anal, and pelvic fins dusky, more intensely pigmented distally; soft dorsal and caudal fins dusky; pectoral fin darker than other fins except tip of spiny dorsal; lower jaw and upper lip white; peritoneum white. In the smaller paratypes the dusky upper sides are broken up with several pale blotches, which appear to have a small cyst at their centers.

Genus STELLIFER Oken

Stellifer Oken, Isis, 1817, p. 1182. (Genotype, *Bodianus stellifer* Bloch.) (Ref. copied.)

STELLIFER RASTRIFER (Jordan)

Stelliferus rastrifer Jordan, *in* Jordan and Eigenmann, Rep. U. S. Fish Comm. for 1886, vol. 14, pp. 391, 393, 1889 (coast of Brazil).

U. S. N. M. No. 128257, 3 specimens, 16.5 to 72.5 mm., Jacuque Point, U. S. S. *Niagara*, January 26, 1925.

U.S.N.M. No. 128258, 8 specimens, 38 to 123 mm., Point Macolla, U. S. S. *Niagara*, April 19, 1925.

The following counts were made: Dorsal rays XI–I, 22 in 4 specimens, XI–I, 23 in one, XI–I, 24 in two, XII–I, 21 in two, XII–I, 22 in one; anal rays II, 8 in 8 specimens; gill rakers on first gill arch were 19 + 1 + 28 and 20 + 1 + 30, and in two other counts on lower part of first gill arch there were 28 and 30 gill rakers; pectoral fin rays in

one specimen counted numbered 20, and the vertical scale rows above lateral line numbered 51 in two specimens with 6 scales from base of first soft dorsal ray to lateral line and 8 from the lateral line to the anal origin.

Genus BAIRDIELLA Gill

Bairdiella Gill, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 33. (Genotype, *Bodianus argyroleucus* Mitchill=*Dipterodon chrysurus* Lacepède.) (Ref. copied.)

BAIRDIELLA RONCHUS (Cuvier and Valenciennes)

Corvina ronchus Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 107, 1830 (Surinam; San Domingo; [?] Maracaibo).

Bairdiella ronchus Eigenmann, Mem. Carnegie Mus., vol. 5, p. 72, 1912 (Maracaibo).

U.S.N.M. No. 121746, 4 specimens, 61.5 to 102 mm., from mouth of Caño de Sagua, 25 km. north of Sinamica, March 12, 1942.

The following counts were made: Dorsal rays X–I, 23 in one specimen, X–I, 24 in two, and X–I, 25 in one; anal rays II, 8 in 4 specimens; pectoral rays 17 in one count; gill rakers on first gill arch 10 + 1 + 16 in one, 9 + 1 + 15 in three specimens; scale rows in one count 55.

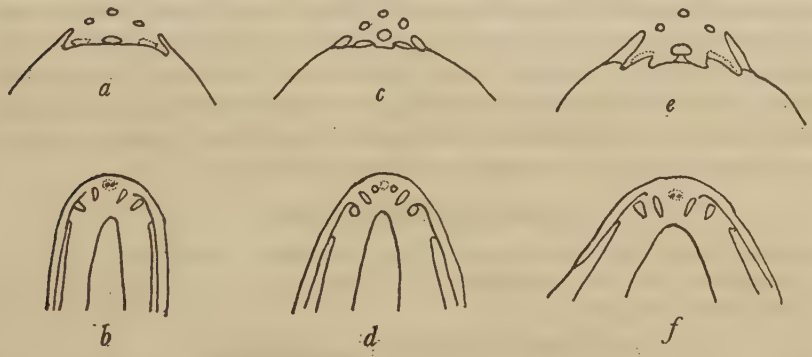

Figure 19.—Diagrammatic sketches of the tip of the snout and of the anterior part of the underside of the lower jaw of three species of sciaenid fishes: *a*, Snout tip of *Bairdiella chrysura* (Lacepède); *b*, lower jaw of *B. chrysura; c*, snout tip of *Stellifer rastrifer* (Jordan); *d*, lower jaw of *S. rastrifer; e*, snout tip of *Ophioscion typicus* Gill (type U.S.N.M. No. 22861); *f*, lower jaw of *O. typicus*. Sketches by author.

Genus PACHYURUS Agassiz

Pachyurus Agassiz, *in* Spix and Agassiz, Selecta genera et species piscium Brasiliam, p. 128, 1831. (Genotype, *Pachyurus squamipinnis* Agassiz.)

PACHYURUS SCHOMBURGKII Günther

Pachyurus schomburgkii Günther, Catalogue of the fishes in the British Museum vol. 2, p. 282, 1860 (Río Capim, Pará; Caripe, Pará, Brazil).

Dr. F. F. Bond collected 45 specimens 17 to 57 mm. in standard length in the Río Apure at San Fernando de Apure on February 16, 1938. These small specimens warrant a brief description because this and allied species are not well known and are rather scarce in museum collections. In fact, for several reasons, among them the small size and coloration of the specimens, I am not even sure these specimens are *P. schomburgkii*.

The following counts were made: Dorsal rays X, I, 24 in one, X, I, 25 in three, X, I, 26 and X, I, 27 in four each, one count each of X, I, 28 and X, I, 29. Anal rays II, 6 in 14 counts. Pectoral rays ii, 16 in two; ii, 17 in five; and ii, 18 in three counts. Gill rakers on first gill arch 5 + 1 + 10 in three counts, 5 + 1 + 11 in two, 6 + 1 + 10 in six, and 6 + 1 + 11 in three counts. Number of vertical scale rows from upper edge of gill opening to midbase of caudal fin 81 in one count, 82 in two, 83 in two, 84 in one, 85 in six, 86 in one, and 87 in one count. There were 8 scales from the base of the first soft dorsal ray to lateral line in 14 counts and from the anal origin to lateral line 9 scales in four and 10 in eight counts.

The coloration is somewhat uniform. A series of about five to seven vertically elongate brown spots occur along the middle of the sides; on the smallest specimens only occur four brown blotches on the back along base of dorsal fin, the first in front of spiny dorsal, second along rear of base of spiny dorsal, and two along base of soft dorsal; opercle of all specimens with a brownish blotch; tips of dorsal spines blackish; soft dorsal with a row of small dark spots extending along its middle on the membranes; caudal fin dusky.

Genus MACRODON Schinz

Macrodon Schinz, Das Thierreich, vol. 2, p. 482, 1822. (Genotype, *Lonchurus ancylodon* Bloch and Schneider.) (Substitute name for *Ancylodon*, preoccupied.) (Ref. copied.)

MACRODON ANCYLODON (Bloch and Schneider)

Lonchurus ancylodon Bloch and Schneider, Systema ichthyologiae, p. 102, pl. 25, 1801 (Surinam).

U.S.N.M. No. 128251, 1 specimen, 270 mm. in standard length, Gulf of Venezuela, depth 35 feet, U. S. S. *Niagara*, December 1, 1924.

This specimen has X–I,28 dorsal rays and II,9 anal rays. The gill rakers on the first gill arch number 3+1+9 and are about one-third the diameter of the eye. The vertical scale rows above the lateral line number 120, and there are about 13 scales from base of first soft dorsal ray to lateral line and about 15 from anal origin to lateral line. The pectoral fin has about 16 rays. The pectoral fins extend considerable distance past tips of pelvics. The soft dorsal fin is not heavily scaled except its basal two-thirds but caudal and anal fins are thickened with scales over two-thirds the way out.

Genus CYNOSCION Gill

Cynoscion Gill, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 81. (Genotype, *Otolithus toeroe* Cuvier and Valenciennes=*Cheilodipterus acoupa* Lacepède.)

Undoubtedly additional species of *Cynoscion* will be reported from Venezuela, such as *jamaicensis* from the West Indies and *acoupa* from British Guiana.

The following key, constructed mostly from the literature, should serve to distinguish those species expected to occur in Venezuelan waters:

1*a*. Soft dorsal rays 23 to 30.

2*a*. Soft dorsal rays 29 or 30; anal rays usually II,8; scales cycloid, with about 120 to 130 vertical rows above lateral line; about 6 gill rakers on lower part of first gill arch; head 3.5 to 3.66; depth 4.8 to 5.2.

Cynoscion virescens [21] (Cuvier and Valenciennes)

2*b*. Soft dorsal rays 23 to 25; anal II,9; scales ctenoid, in about 68 to 79 vertical rows above lateral line; about 4+7 on first gill arch; head 3.2 to 3.4; depth 3.5 to 3.8——**Cynoscion jamaicensis** [21] (Vaillant and Bocourt)

1*b*. Soft dorsal rays 18 to 22.

3*a*. Scales cycloid in about 100 to 120 rows above lateral line; soft dorsal rays 20 to 22, anal II,10 or 11; gill rakers about 2+1+6 or 7 on lower part of first gill arch; head 3 to 3.4; depth 3.6 to 4.2.

Cynoscion leiarchus (Cuvier and Valenciennes)

3*b*. Scales ctenoid, in from 65 to 90 rows above lateral line; dorsal soft rays 18 to 21; gill rakers on first gill arch 3 to 5+8 to 10; anal rays II,8 to 10.

4*a*. Soft dorsal rays 20 to 21; anal rays II,8 to 10; scales with pores number 57 to 64; head 3.8 to 4; depth 4; soft dorsal and anal heavily scaled; highest dorsal spine 1.8 in head; pectorals extending about two-thirds the way out the pelvics; axil of pectoral dark.

Cynoscion steindachneri [21] (Jordan and Eigenmann)

4*b*. Soft dorsal rays 19 to 21; anal rays II,8 or 9; scales with pores number 55 to 65; soft dorsal and anal with basal two-thirds scaled only; pectorals not quite reaching tips of pelvics; head 3.4 to 3.8; depth 3.8 to 4; axil of pectoral pale——**Cynoscion acoupa** [21] (Lacepède)

4*c*. Soft dorsal rays 18 or 19, usually 18; anal rays II,8; scales with pores 54 to 59; soft dorsal and anal with scales on basal one-third only; head about 3.25; depth 4.25; axil of pectoral dark.

Cynoscion maracaiboensis, new species

CYNOSCION LEIARCHUS (Cuvier and Valenciennes)

CORVINA

Otolithus leiarchus Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 78, 1830 (Brazil; Cayenne).

U.S.N.M. No. 128255, 1 specimen 395 mm. in standard length, Amuay Bay, U. S. S. *Niagara*, May 15, 1925.

U.S.N.M. No. 128256, 1 specimen 395 mm., Estanques Bay, U. S. S. *Niagara*, December 8, 1924.

U.S.N.M. No. 123198, 3 specimens, 23 to 26 mm., south coast of Venezuela, U. S. S. *Niagara*; these are identified with doubt as this species. They have II,11 anal rays and X–I, 21 to 23 dorsal rays.

[21] Not yet reported from Venezuela.

CYNOSCION MARACAIBOENSIS, new species

CORVINA DE LAGO

FIGURE 20

Otolithus toe-roe (in part) CUVIER and VALENCIENNES, Histoire naturelle des poissons, vol. 5, p. 72, 74, 1830 (Lago de Maracaibo).

Otolithus cayennensis (in part) GÜNTHER, Catalogue of the fishes in the British Museum, vol. 2, p. 309, 1860 (Lago Maracaibo).

Holotype.—U.S.N.M. No. 121742, 255 mm. in standard length, collected in the Río Agua Caliente, 2 to 3 km. above Lago de Maracaibo, Venezuela, by Leonard P. Schultz, May 1, 1942.

Paratypes.—(All paratypes collected by Leonard P. Schultz in 1942).

U.S.N.M. No. 121743, a specimen, 226 mm., bearing same data as the holotype.

U.S.N.M. No. 121745, 1 specimen, 266 mm., from Río de Los Pájaros, 3 km. above Lago de Maracaibo, April 30.

U.S.N.M. No. 121744, 2 specimens, 239 and 261 mm., Lago de Maracaibo, 2 km. off Lagunillas, March 15.

Description.—Measurements were made on the types and these, expressed in hundredths of the standard length, are recorded first for the holotype, then for the four paratypes in parentheses, respectively.

Standard lengths in millimeters 255 (266; 226; 261; 239).

Length of head 31.0 (29.3; 30.3; 28.7; 29.0); greatest depth of body 23.1 (21.8; 22.6; 22.8; 24.3); diameter of eye 5.49 (5.26; 5.75; 5.25; 5.44); length of snout 6.88 (7.14; 7.26; 6.97; 6.90); tip of snout to rear of maxillary 13.3 (13.3; 13.5; 13.0; 12.8); least width of preorbital 2.20 (1.88; 2.21; 2.04; 1.88); postorbital length of head 19.3 (18.6; 18.1; 17.4; 17.4); least width of bony interorbital space 5.53 (5.64; 5.75; 5.60; 5.15); length of caudal peduncle or distance from base of last anal ray to midcaudal fin base 21.2 (22.1; 20.8; 21.3; 20.9); least depth of caudal peduncle 7.26 (7.70; 7.78; 7.51; 7.95); length of base of second dorsal fin 31.8 (33.1; 33.4; 34.1; 33.1); length of base of anal fin 9.10 (9.58; 10.2; 9.20; 9.79); length of longest spine of dorsal fin 15.7 (14.1; 16.0; 14.3; —); longest soft ray of dorsal 13.5 (13.7; 14.1; —; —); longest soft ray of anal 14.9 (13.7; 14.7; 14.7; 14.2); length of second anal spine 6.47 (6.20; 6.33; 6.13; 6.07); longest ray of pectoral fin 17.1 (16.2; 17.7; 17.5; 16.9); longest soft ray of pelvic fin 17.9 (17.1; 17.0; 16.5; 17.3); length of pelvic spine 10.2 (10.7; 11.5; 10.4; 9.50); length of longest or middle rays of caudal fin 22.6 (21.8; 23.2; 23.0; 23.2); tip of snout to dorsal origin 35.3 (35.3; 35.2; 33.5; 34.7); snout to anal origin 69.8 (72.6; 72.6; 69.7; 72.4); snout to pectoral insertion 28.9 (28.6; 29.4; 27.4; 27.5); snout to pelvic insertion 30.6 (32.3; 31.9; 31.6; 31.6); length of longest gill raker 4.00 (3.57; 3.10; 4.22; 4.40).

The following counts were made respectively: Dorsal fin rays X–I,19 (X–I,18; X–I,18; X–I,18); anal rays II,8 (II,8; II,8; II,8; II,8);

pectoral rays ii,14–ii,15 (ii,15; ii,15–ii,15; ii,15; ii,15); pelvic rays always I,5; number of gill rakers on first gill arch 5+1+9 (4+1+9; 3+1+8; 5+1+9; 4+1+9) the rudiments without elevations on upper anterior part of gill arch not counted usually number 2 or 3; vertical scale rows above lateral line 85 (79; 83; 81; 84); pores in lateral line 59 (60; 54; 57; 56); scales in a vertical row from lateral line to origin of spiny dorsal fin 9 (10; 10; 10; 10); to origin of second dorsal 9 (8; 9; 9; 9); and to anal origin 8 (8; 8; 8; 8); number of scales in a zigzag row around caudal peduncle 22 (23; 22; 22; 23).

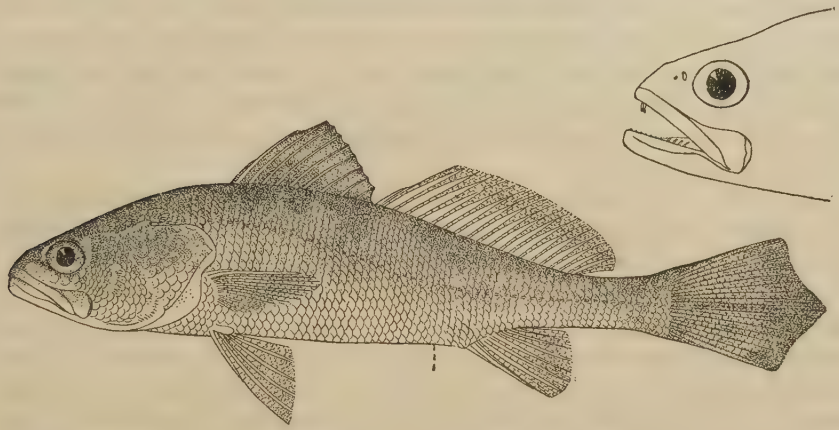

FIGURE 20.—*Cynoscion maracaiboensis*, new species: Holotype (U.S.N.M. No. 121742), 255 mm. in standard length. Drawn by Mrs. Aime M. Awl.

Body elongate, somewhat compressed, the head about 3.25, depth about 4.25, in standard length; anterior profile rounded, the greatest depth at origin of dorsal; snout a little longer than interorbital space; eye nearly equal to interorbital space, the latter 5⅓ in head; rear edge of maxillary under rear margin of eye; two pairs of canines at midfront of premaxillary, these teeth hooked backward, the posterior pair largest; both upper and lower jaws with a band of villiform teeth, along the outer margin of which are widely spaced short canine teeth; preopercle without spines, with a membranous edge; opercle ending in a wide membranous edge, the portion between the flat spinelike angles at upper posterior end covered with minute scales; scales on head smooth but those on body ctenoid; scales above lateral line anteriorly much smaller than those between soft dorsal fin and lateral line; scales below lateral line anteriorly much larger than the scales above lateral line; pectoral fins not quite reaching opposite tips of pelvic fins; posterior margin of spiny dorsal fin nearly straight, the fourth spine projecting past the third when fin is distended; distal margin of soft dorsal nearly straight, the anterior rays longest,

gradually becoming a little shorter posteriorly; middle rays of caudal fin longest; distal margin of anal fin nearly straight, or slightly rounded; distal margins of paired fins rounded; origin of second dorsal fin equidistant between midcaudal fin base and front of eye; anus equidistant between pelvic insertion and midcaudal fin base; base of anal fin 3.5 times in base of second dorsal fin; pelvic fins reach one-half the way to the anus; least depth of caudal peduncle about 3 times in its length.

Coloration.—Silvery on sides, white below, dusky above; back along base of spiny and soft dorsal brownish; base of each lobe of caudal fin with some brownish pigment; spiny dorsal fin dusky brown and soft dorsal and anal fins pale dusky; a brownish spot at upper edges of pectoral fin base; pelvics pale; pectoral fin with a little brownish pigment; upper edges of maxillary and premaxillaries brownish; peritoneum white.

Remarks.—This new species of *Cynoscion* is abundant in Lago de Maracaibo, where large numbers are caught on hook and line and by jigging. It is usually in the market at Maracaibo.

Cynoscion maracaiboensis, with its ctenoid scales, with scales only on the basal parts of soft dorsal and of soft anal fins, and with but 18 or 19 soft rays in the dorsal fin, is readily distinguished from all other species of *Cynoscion* in American Atlantic waters except *C. acoupa. C. steindachneri, C. nothus, C. regalis, C. arenarius,* and *C. jamaicensis* all have 20 or more soft dorsal rays. *C. striatus* has about 19 or 20 soft dorsal rays, 8 or 9 soft anal rays, and very large scales, about 52 to 56 pores and 62 to 66 vertical scale rows above the lateral line, whereas *C. maracaiboensis* has 54 to 59 pores and 79 to 85 scale rows respectively. The number of gill rakers on a specimen of *C. striatus* numbered 6+1+16, including all rudiments that showed any development.

Cynoscion maracaiboensis is most closely related to *C. acoupa* (Lacepède) but differs from it by having 18 or 19 soft dorsal rays, 79 to 85 vertical scale rows above the lateral line, and 54 to 59 pores in lateral line instead of about 85 scale rows above, 19 to 21 soft dorsal rays, and about 55 to 66 pores in the lateral line, according to Ribeiro (Arch. Mus. Nac. Rio de Janeiro, vol. 17, p. 36, 1915) and Eigenmann (1912).

Genus CORVULA Jordan and Eigenmann

Corvula JORDAN AND EIGENMANN, Rep. U. S. Comm. Fish. for 1886, vol. 14, p. 377, 1889. (Genotype, *Johnius batabanus* Poey.)

CORVULA SANCTAE-LUCIAE Jordan

Corvula sanctae-luciae JORDAN, Proc. U. S. Nat. Mus., vol. 12, p. 649, 1890.

U.S.N.M. No. 128248, 2 specimens, 54 and 56 mm. in standard length, from Jacuque Point, U. S. S. *Niagara,* January 26, 1925.

U.S.N.M. No. 128261, 1 specimen, 178 mm., from Estanques Bay, U. S. S. *Niagara*, December 8, 1924.

U.S.N.M. No. 128249, 1 specimen, 131 mm., from Point Macolla, U. S. S. *Niagara*, April 19, 1925.

The following counts were made on the above listed specimens: Dorsal rays X–I, 23; X–I, 25; X–I, 23; X–I, 23. Anal rays II, 9; II, 9; II, 9; II, 8. Number of gill rakers on first gill arch 8 + 1 + 17; 8 + 1 + 17; 9 + 1 + 18; 8 + 1 + 17. Vertical scale rows above lateral line 50; 51; 52. Usually 7 scales from lateral line to base of first soft dorsal ray and 7 scales to anal origin.

Genus LARIMUS Cuvier and Valenciennes

Larimus Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 145, 1830. (Genotype, *Larimus breviceps* Cuvier and Valenciennes.)

LARIMUS BREVICEPS Cuvier and Valenciennes

Larimus breviceps Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 5, p. 146, pl. 111, 1830 (San Domingo; Brazil).

U.S.N.M. No. 128250, 3 specimens, Point Macolla, U. S. S. *Niagara*, April 19, 1925.

The following counts were made: Dorsal rays X–I, 31; X–I, 27; X–I, 27. Anal rays II, 6; II, 6; II, 6. Gill rakers, long, slender, on first arch number 9 + 1 + 20; 9 + 1 + 18. Number of vertical scale rows 49; 49; 48; 6 scales from lateral line to base of first soft dorsal ray and 6 to anal origin.

Genus EQUETUS Rafinesque

Equetus Rafinesque, Analyse de la nature, p. 89, 1815 (substitute for *Eques* Bloch, preoccupied). (Genotype, *E. americanus* Bloch = *Chaetodon lanceolatus* Linnaeus.)

EQUETUS PUNCTATUS Bloch

Eques punctatus Bloch, *in* Bloch and Schneider, Systema ichthyologiae, p. 106, 1801 (Cuba).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 73, 1919 (coast of Venezuela).

Family MULLIDAE: Salmonetes

Genus MULLUS Linnaeus

Mullus Linnaeus, Systema naturae, ed. 10, p. 299, 1758. (Genotype, *M. barbatus* Linnaeus.)

MULLUS AURATUS Jordan and Gilbert

Mullus barbatus auratus Jordan and Gilbert, Proc. U. S. Nat. Mus., vol. 5, p. 280, 1882 (Pensacola, Fla.).

The following specimen was identified by Dr. S. F. Hildebrand:

U.S.N.M. No. 123177, 1 specimen, 42 mm., Estanques Bay, U. S. S. *Niagara*, February 20, 1925.

Genus PSEUDUPENEUS Bleeker

Pseudupeneus Bleeker, Versl. Akad. Amsterdam, vol. 14, p. 134, 1862. (Genotype, *P. prayenis* Bleeker.) (Ref. copied.)

PSEUDUPENEUS MACALATUS (Bloch)

CHIVO

Mullus maculatus Bloch, Naturgeschichte der ausländischen Fische, vol. 7, p. 95, 1793 (Brazil).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 88, 1919 (Puerto Cabello, Venezuela).

Family POLYCENTRIDAE

Genus POLYCENTRUS Müller and Troschel

Polycentrus Müller and Troschel, *in* Schomburgk, Reisen in Britisch-Guiana, vol. 3, p. 622, 1848. (Genotype, *Polycentrus schomburgkii* Müller and Troschel.)

POLYCENTRUS SCHOMBURGKII Müller and Troschel

Polycentrus schomburgkii Müller and Troschel, *in* Schomburgk, Reisen in Britisch-Guiana, vol. 3, p. 622, 1848.—Regan, Proc. Zool. Soc. London, 1906, pt. 1, p. 391, pl. 25, fig. 12 (Trinidad; Venezuela; Guiana).—Fowler, Fish Culturist, vol. 22, No. 9, p. 65, 1943 (Trinidad; Guiana; Venezuela).

3 specimens, 22 to 37 mm., near Caripito, William Beebe, August 10, 1942.
1 specimen, 34 mm., near Caripito, William Beebe, 1942.

Family CHAETODONTIDAE: Butterfly-fishes

Genus CHAETODON Linnaeus

Chaetodon Linnaeus, Systema naturae, ed. 10, p. 272, 1758. (Genotype, *Chaetodon capistratus* Linnaeus.)

CHAETODON STRIATUS Linnaeus

Chaetodon striatus Linnaeus, Systema naturae, ed. 10, p. 275, 1758 (India).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 91, 1919 (Venezuela).

Family EPHIPPIDAE

Genus CHAETODIPTERUS Lacepède

Chaetodipterus Lacepéde, Histoire naturelle des poissons, vol. 4, p. 503, 1802. (Genotype, *Chaetodipterus plumierii* Lacepède.)

CHAETODIPTERUS FABER (Broussonet)

SPADEFISH

Chaetodon faber Broussonet, Ichthyologia sistens piscium, p. 19, pl. 6, 1782.
Ephippus faber Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 90, 1919 (Venezuela).

U.S.N.M. No. 123080, 1 specimen, 57 mm. in standard length, Cape San Román, U. S. S. *Niagara*, April 2, 1925.

U.S.N.M. No. 123183, 1 specimen, 15 mm., south coast of Gulf of Venezuela, U. S. S. *Niagara*, November 15, 1925.

Family ACANTHURIDAE: Surgeonfishes

Genus ACANTHURUS Forskål

Acanthurus Forskål, Descriptiones animalium, p. 59, 1775. (Genotype, *Chaetodon schal* Forskål.)

ACANTHURUS HEPATUS (Linnaeus)

Teuthis hepatus Linnaeus, Systema naturae, ed. 12, p. 507, 1766 (Carolina).
Acanthurus hepatus Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 95, 1919 (Puerto Cabello, Venezuela).

Family CICHLIDAE: Mojarros de Río

KEY TO THE GENERA OF CICHLIDAE REPORTED FROM VENEZUELA

1*a*. Dorsal with a notch posteriorly in spinous part of fin; gill rakers elongate, setiform, about 5+16; lateral line continuous at least in young; preopercle entire; jaws with a band of villiform teeth; dorsal rays about XV, 17; anal rays III, 11 or 12; about 85 scale rows below lateral line from head to mid-caudal base; mouth large, lower jaw projecting a little; body elongate. **Cichla** Bloch and Schneider

1*b*. Dorsal fin without a notch; gill rakers short, stubby, not elongate.

2*a*. A dark brown bar from dorsal origin through eye to isthmus, another across middle of body, and a third one from prolonged soft rays of dorsal and anal fins across body; base of caudal with dark bar and this fin barred; preopercular edge entire; dorsal rays XI to XIII, 23 to 30; anal rays V to VII, 24 to 32; teeth conical, occurring along the front and sides of the jaws; scale rows from head to midcaudal base 33 to 47; depth of body from 1 to 1.5 in standard length; scales rough; first soft rays of dorsal, anal, and pelvics prolonged or filamentous; jaws about equal. **Pterophyllum** Heckel

2*b*. Body without 3 dark cross bars as described in 2*a*.

3*a*. Scales of the lateral line larger than those above or below it; preopercular edge serrated posteriorly; body elongate; lower jaw projecting; scale rows from upper edge of gill opening to mid-caudal fin base below lateral line 38 to 130; dorsal rays XVI to XXV, 11 to 19; anal rays III, 7 to 12 ..... **Crenicichla** Heckel

3*b*. Scales along lateral line about same size as others; preopercular edge entire.

4*a*. Upper part of first gill arch with a downward-projecting lobe, the gill rakers near its margin; upper lateral line well separated from dorsal fin base; mouth small; premaxillary not greatly protractile; preorbital width twice the eye; scales rough, large, about 25 to 39; dorsal spines XII to XIX and anal spines III. (Not yet reported from Venezuela but to be expected in that region.) **Geophagus** Heckel

4*b*. No downward-projecting lobe on upper part of gill arch.

5*a*. Anal spines III or IV, or if IV the lateral line is one-half a scale from dorsal fin posteriorly; soft vertical fins scaleless or with a row of scales at base only.

6*a*. Rear end of maxillary well exposed under eye; premaxillaries excessively protractile, the posterior ascending process extending to opposite rear of orbits, or past beginning of scaled area on top of head; gill rakers about 2+10 or 11; scales 23 or 24;

dorsal rays XIII or XIV, 9 to 11; anal rays III, 8 or 9; upper lateral line posteriorly with one-half scale between it and base of dorsal fin ..... **Acaronia** Myers

6*b*. Rear end of maxillary not exposed.

7*a*. Upper lateral line separated from dorsal fin base by one-half a scale for part of its length posteriorly; preopercle scaled; dorsal rays XVI or XVII, 7 or 8; anal rays III or IV, 7 or 8; scales about 23 or 24; body somewhat elongate, compressed. **Nannacara** Regan

7*b*. Upper lateral line one or more scale rows from dorsal fin base even at its posterior end; preopercle naked; body compressed; dorsal rays XIII to XVI, 7 to 12; anal III, 6 to 11. **Aequidens** Eigenmann and Bray

5*b*. Anal spines IV to VII or if IV spines the lateral line is separated from the dorsal fin base by more than one row of scales; preopercle naked; teeth conical; inner ones smallest.

8*a*. Posterior ascending process of premaxillaries as long as head or extending as far as opposite rear of orbits, much past beginning of scaled area between orbits; lower jaw longest; the rear of maxillary much exposed and projecting beyond preorbital sheath; body compressed; dorsal rays XV or XVI (rarely XVII). 10 to 13; anal rays V to VI (rarely VII), 8 to 10; gill rakers about 8 to 11 on lower part of first arch; pores in lateral line about 20 or 21+9 to 11 ..... **Petenia** Günther

8*b*. Premaxillary process not extending past middle of interorbital space, and much shorter than head; dorsal rays XIV to XIX, 7 to 15; anal rays IV to XII, 6 to 14; base of soft rays of median fins usually with a few rows of scales ..... **Cichlasoma** Swainson

Genus CICHLA Bloch and Schneider

Cichla Bloch and Schneider, Systema ichthologiae, p. 336, 1801. (Restricted to *Cichla ocellaris* Bloch and Schneider by Heckel, Ann. Wien. Mus. Naturg., vol. 2, p. 308, 1840. Genotype designated by Eigenmann, Mem. Carnegie Mus., vol. 5, p. 509, 1912, as *Cichla ocellaris* Bloch and Schneider.)

CICHLA OCELLARIS Bloch and Schneider

Pavón

Cichla ocellaris Bloch and Schneider, Systema ichthyologiae, p. 340, 1801.

Crenicichla orinocensis [Humboldt] Günther, Catalogue of the fishes in the British Museum, vol. 4, p. 309, 1862 (Rio Negro; Orinoco).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 70, 1891 (Orinoco).—Röhl, Fauna descriptiva de Venezuela, p. 384, 1942 (Orinoco; Rio Negro).

Cichla temensis Eigenmann and Allen, Fishes of western South America, p. 403, 1942 (Orinoco).

Genus PTEROPHYLLUM Heckel

Pterophyllum Heckel, Ann. Wien. Mus. Naturg., vol. 2, p. 334, 1840. (Genotype, *Pterophyllum scalaris* Heckel=*Platax scalaris* Cuvier and Valenciennes.)

KEY TO THF SPECIES OF PTEROPHYLLUM REPORTED FROM VENEZUELA

1*a*. Scale rows 33 to 38 on side of body from head to base of caudal fin; gill rakers 12 to 14 on lower part of first arch· lateral line pores 17 to 19+9 to 11;

dorsal rays XI to XIII, 23 to 27; anal rays V to VII, 24 to 29; cheek with 4 or 5 series of scales__**Pterophyllum scalaris** (Cuvier and Valenciennes)

1*b*. Scale rows 41 to 47; gill rakers on lower part of first arch 11; lateral line pores 17 to 19+9 to 11; dorsal rays XII or XIII, 27 to 30; anal rays V or VI, 28 to 32; cheek with 6 or 7 series of scales__**Pterophyllum altum** Pellegrin

PTEROPHYLLUM SCALARIS (Cuvier and Valenciennes)

SCALARE

Platax scalaris CUVIER AND VALENCIENNES, Histoire naturelle des poissons, vol. 7, p. 237, 1831.

Pterophyllum scalaris HECKEL, Ann. Wien. Mus. Naturg., vol. 2, p. 335, 1840 (Barra do Rio Negro).—STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 71, p. 76, 1875 (Barra do Rio Negro).—REGAN, Proc. Zool. Soc. London, 1905, pt. 1, p. 190 (Rio Negro).

Pterophyllum EIGENMANN AND ALLEN, Fishes of western South America, p. 406, 1942 (Orinoco).

PTEROPHYLLUM ALTUM Pellegrin

Pterophyllum altum PELLEGRIN, Bull. Mus. Hist. Nat., Paris, vol. 9, p. 125, 1903 (Atabapo, Orinoco); Mem. Soc. Zool. France, vol. 16, p. 252, 1903 (Atabapo, Orinoco).—REGAN, Ann. Mag. Nat. Hist., Ser. 7, vol. 16, p. 442, 1905 (Río Orinoco).—AHL, Zool. Anz., vol. 76, p. 255, 1938 (Orinoco).

Genus CRENICICHLA Heckel

Crenicichla HECKEL, Ann. Wien. Mus., vol. 2, p. 416, 1840. (Genotype, *Crenicichla vittata* Heckel designated in Jordan's Genera of fishes, vol. 2, p. 207, 1919.)

The species of *Crenicichla* centering around *macrophthalma* Heckel in the Rio Negro and Orinoco systems are not clearly defined and need revision. Probably *macrophthalma* should be broken into subspecies and *C. lacustris* (Castelnau) included with this group.

KEY TO THE SPECIES OF CRENICICHLA REPORTED FROM VENEZUELA

1*a*. Nostril nearer to tip of snout than eye; scales smooth, not rough or ctenoid, about 97 to 107 rows from upper edge of gill opening to base of caudal fin below lateral line; maxillary reaching to under anterior margin of eye; lateral-line pores 26 or 27 + 13 or 14; 10 or 11 scales from base of last dorsal spine to lateral line and 6 or 7 scales between lateral lines; dorsal rays XXI to XXIV, 16 or 17; anal rays III, 11 or 12; caudal spot absent; 10 to 12 dark cross bars dorsally, but absent on adults.

Crenicichla johanna Heckel

1*b*. Nostril nearer eye than snout tip or equidistant between snout tip and eye; scales rough or ctenoid at least on side of body.

2*a*. Maxillary reaching to under the eye, at least considerably beyond the anterior margin of eye.

3*a*. Dorsal rays XVII to XX, 13 to 16; ocellated black caudal spot present.

4*a*. Humeral spot present on lateral line, not below it, except absent on young; a dark band from snout passes through eye to midbase of caudal fin; each side of tip of chin blackish, interspace pale; dorsal rays XVIII or XIX, 13 to 15; anal rays III, 9 or 10; scale rows from upper edge of gill opening to caudal base below lateral line 58 to 69;

pores in lateral line about 23 or 24 + 11; about 4 scales from base of last dorsal spine to lateral line and 2 scales between lateral lines.
Crenicichla alta Eigenmann

4*b*. Humeral spot below lateral line; a dark band from snout passing through eye ending in humeral spot; sides of body dorsally sometimes with dark bars; chin darkish, middle not pale; dorsal rays XVII to XX, 13 to 16; anal III, 8 to 10; scale rows about 50 to 60; pores in lateral line 22 to 26 + 9 to 12; 3 or 4 scales from base of last dorsal spine to lateral line and 2 or 3 scales between lateral lines.
Crenicichla saxatilis (Linnaeus)

3*b*. No humeral spot; dorsal rays XXII, 11; anal III, 8; scale rows about 57; pores in lateral line 24 + 10; scales between lateral line and last dorsal spine 4, and between lateral lines 2; a dark stripe from eye to operculum and sometimes dark blotches along middle of sides.
Crenicichla geayi Pellegrin

2*b*. Maxillary reaching only to a vertical line through front of eye or not to front of eye.

5*a*. Maxillary not extending to a vertical line through front margin of eye; scale rows about 57; lateral line pores about 21 + 10; dorsal rays usually XX or XXI, 9 to 11; anal rays III, 7 to 9; scales from base of last dorsal spine to lateral line 2 and 3 between lateral lines; no humeral spot; a dark streak from snout past eye to caudal fading on caudal in adults; young with 7 or 8 dark cross bars on back.
Crenicichla wallacii Regan

5*b*. Maxillary reaching to a vertical line through front margin of eye.

6*a*. Scale rows from upper edge of opercular opening to midcaudal fin base 62 to 70; pores in lateral line 23 to 25 + 11 to 13; 4 scales between base of last dorsal spine and lateral line, and 2 or 3 scales between lateral lines; dorsal rays XX to XXII,10 to 13; anal rays III,7 to 9; a dark stripe through eye to operculum; in young about 7 double cross bars; no distinct humeral spot; ocellated caudal spot at least in young----------**Crenicichla macrophthalma** Heckel

6*b*. Scale rows 106 to 113; pores in lateral line 25 to 27 + 14 or 15; 10 or 11 scales from last dorsal spine to lateral line and 4 to 6 scales between lateral lines; black spot at base of middle caudal rays; young with lines of black dots----------**Crenicichla lugubris** Heckel

CRENICICHLA JOHANNA Heckel

Crenicichla johanna Heckel, Ann. Wien. Mus. Naturg., vol. 2., p. 425, 1840 (Río Guaporé).—Regan, Proc. Zool. Soc. London, 1905, pt. 1, p. 168 (Venezuela).—Ihering, Rev. Mus. Paulista, vol. 7, p. 307, 1907 (Venezuela).—Eigenmann and Allen, Fishes of western South America, p. 406, 1942 (Venezuela).

CRENICICHLA ALTA Eigenmann

Crenicichla alta Eigenmann, Mem. Carnegie Mus., vol. 5, p. 516, pl. 68, fig. 3, 1912 (Gluck Island and other localities in British Guiana).

One specimen, 51 mm., from near Caripito, William Beebe.

The above specimen lacks the humeral spot, but the black lateral band is prominent; ocellated black caudal spot at base of caudal fin rays above end of lateral line. The following counts were made: Dorsal rays XVIII,15; anal III,9; scale rows 58, pores in lateral line 24 + 11.

CRENICICHLA SAXATILIS (Linnaeus)

Sparus saxatilis Linnaeus, Systema naturae, ed. 10, p. 278, 1758 (Surinam) (ref. copied).

Crenicichla saxatilis Regan, Proc. Zool. Soc. London, 1906, pt. 1, p. 391 (Rio Grande do Sul to Venezuela; Trinidad).

Two specimens, 91 and 112 mm., Caripito, William Beebe, May 7, 1942.

CRENICICHLA GEAYI Pellegrin

Matoguaro

Crenicichla geayi Pellegrin, Bull. Mus. Hist. Nat. Paris, vol. 9, p. 123, 1903 (Venezuela); Mem. Soc. Zool. France, vol. 16, p. 375, 1903 (Venezuela).—Regan, Proc. Zool. Soc. London, 1905, pt. 1, p. 161 (near Bogotá; Río Orinoco).—Eigenmann, Indiana Univ. Stud., vol. 7, No. 44, p. 13, 1920 (Concejo, Río Tiquirito; Isla del Buro; Maracay, Río Bue; Río Castaño—all Venezuela).—Pearse, Univ. Wisconsin Studies, No. 1, pp. 20, 43, 1920 (Isla del Buro and Río Castaño, Lake Valencia, Venezuela).—Röhl, Fauna descriptiva de Venezuela, p. 384, 1942 (Venezuela).

The records for this species for the upper Orinoco system should be rechecked to determine if they have been confused with *macrophthalma*.

CRENICICHLA WALLACII Regan

Crenicichla wallacii Regan, Proc. Zool. Soc. London, 1905, pt. 1, p. 163, pl. 14, fig. 2 (Río Essequibo; Río Negro).

CRENICICHIA MACROPHTHALMA Heckel

Crenicichla macrophthalma Heckel, Ann. Wien. Mus. Naturg., vol. 2, p. 427, 1840 (Río Negro).—Peters, Monatsb. Akad. Wiss. Berlin, 1877, p. 469 (Calabozo).—Sachs, Aus den Llanos, 1879, p. 127 (Calabozo).—Eigenmann and Eigenmann, Proc. U. S. Nat. Mus., vol. 14, p. 70, 1891 (Orinoco).

The following collections were made in Venezuela during 1942:

U.S.N.M. No. 121658, 2 specimens, 42 and 50 mm. in standard length, Río Guárico and tributaries between San Sebastián and San Casimiro, L. P. Schultz, G. Zuloaga, William Phelps, Jr., R. Sherman, May 12.

3 specimens, 41 to 63 mm., near Caripito, Dr. William Beebe.

The above specimens are referred to this species with some uncertainty since the numbers of fin rays do not exactly agree and both collections may represent new subspecies of *macrophthalma*. The specimens from the Río Guárico have the following counts: Dorsal rays XXI, 13, XXII, 12; anal rays III, 7 and III, 8 while those from near Caripito have XXII, 11; XXII, 12; XXII, 12; anal rays III,9; III, 9; III, 9. The number of scale rows are about 62 to 64 in both collections and 26 scales in a zig-zag row around caudal peduncle. The coloration in all specimens consists of about 7 blackish doubled crossbars, the middle of each dark bar is pale; ocellated caudal spot prominent; a dark band past eye to end of opercle, thence represented along anterior midside by intensification of pigment in each bar, interspaces pale; no humeral spot; caudal fin slightly barred or plain.

CRENICICHLA LUGUBRIS Heckel

Crenicichla lugubris Heckel, Ann. Wien. Mus. Naturg., vol. 2, p. 422, 1840 (Rio Negro).—Regan, Proc. Zool. Soc. London, 1905, pt. 1, p. 165 (Brazil; Guiana; Venezuela).

Genus ACARONIA Myers

Acaronia Myers, Stanford Ichthyol. Bull., vol. 1, No. 5, p. 170, 1940 (replaces *Acaropsis* Steindachner, preoccupied). (Genotype, *Acara nassa* Heckel.)

Acaropsis Steindachner, Sitzb. Akad. Wiss. Wien, vol. 71, p. 99, 1875. (Genotype, *A. nassa* Heckel.)

ACARONIA NASSA (Heckel)

Acara nassa Heckel, Ann. Wien. Mus. Naturg., vol. 2, p. 353, 1840 (Río Guaporé).

Acaronia nassa Eigenmann and Allen, Fishes of western South America, p. 388, 1942 (Orinoco).

Genus NANNACARA Regan

Nannacara Regan, Ann. Mag. Nat. Hist., ser. 7, vol. 15, p. 344, 1905. (Genotype, *Nannacara anomala* Regan.)

NANNACARA ANOMALA Regan

Nannacara anomala Regan, Ann. Mag. Nat. Hist., ser. 7, vol. 15, p. 344, 1905 (Río Essequibo).

Three specimens, 27 to 31 mm. in standard length, from Caripito, William Beebe, 1942.

Table 19.—*Counts of fin rays made on* Nannacara anomala *Regan*

Locality	Dorsal				Anal		
	XVI, 7	XVI, 8	XVII, 7	XVII, 8	III, 7	III, 8	IV, 7
Caripito	1		2				3
? British Guiana. U.S.N.M. No. 94919	3	1		1	3	1	1

Genus AEQUIDENS Eigenmann and Bray [22]

Aequidens Eigenmann and Bray, Ann. New York Acad. Sci., vol. 7, p. 616, 1894. (Genotype, *Acara tetramerus* Heckel.)

KEY TO THE SPECIES OF AEQUIDENS REPORTED OR EXPECTED TO OCCUR IN VENEZUELA

1*a*. Two or 2½ scales between base of first soft ray of dorsal fin and lateral line; the blackish lateral streak or band, if present, extending from eye through black lateral blotch to upper half of base of caudal fin rays; gill rakers 2 or 3 + 5 or 6 on first arch.

2*a*. Base of caudal fin rays with a prominent black spot, about one-half size of eye, located entirely above midaxis of caudal fin or lateral line if it extends on base of fin.

[22] As here understood, *Acara* Heckel, 1840, with its type restricted by Gill to *Acara crassispinis* Heckel = *Lobotes ocellatus* Agassiz, is a synonym of *Astronotus* Swainson, 1839, with its type, *Lobotes ocellatus* Agassiz, the only species mentioned. Thus, in Regan's revision of the South American cichlid genera, his use of *Acara* is a synonym of *Aequidens*.

3*a*. Dorsal rays usually XV or XVI,10; anal rays III, 8 to 10, usually III,8 or 9; a dark blotch present under rear of eye; usually 2.5 scales between lateral line and base of first soft ray of dorsal (Amazon, Río Negro, and Guianas)----------**Aequidens tetramerus** (Heckel)

3*b*. Dorsal rays XIV or XV,11 or 12; anal III,8 to 10; a dark bar under rear margin of eye extending downward parallel with edge of preopercle; usually 2 scales above lateral line to first soft ray of dorsal fin (Río Meta)----------**Aequidens metae** [23] Eigenmann

2*b*. Base of caudal fin with a rather wide dark bar, this bar usually more intensely pigmented above the lateral line than below it, the lateral band meeting this bar in its upper half at base of upper caudal fin rays; a dark bar under eye extending toward lower preopercular angle; dorsal rays XIV, 9 or 10; anal rays III, 7 or 8 (British Guiana).

Aequidens potaroensis [23] Eigenmann

1*b*. One and one-half scales between base of first soft ray of dorsal fin and lateral line; blackish lateral streak, if present, extending from eye through black lateral blotch to rear of base of soft dorsal fin or anterior upper edge of caudal peduncle; base of caudal fin with a small to large blackish bar sometimes obscure, except at lateral line, usually a little more developed above lateral line than below lateral line or at midaxis of caudal fin; no black spot at base of upper rays of caudal fin; a dark bar or oblong spot, extending from below eye toward lower preopercular angle; gill rakers 2 or 3 + 5 or 6 on first arch.

4*a*. Caudal fin base with a bar or with an obscure spot at end of lateral line.

5*a*. The blackish lateral band prominent and extending forward to upper rear edge of orbit, thence across top of head, meeting its fellow between rear margins of orbit; lateral blotch lacking, vertical color bars barely visible; dorsay rays XIV,9 or 10; anal rays III,7 or 8; caudal blotch present near end of lateral line on base of caudal fin rays (Río Meta).

Aequidens mariae [23] Eigenmann

5*b*. Vertical bars more prominent than lateral band, the latter indistinct or absent between rear of eyes on dorsal surface of head; lateral blotch usually obvious; fifth dorsal spine equal to or a little shorter than tenth dorsal spine (Trinidad to Colombia)-------**Aequidens pulcher** (Gill)

4*b*. Upper half of caudal fin base with a large prominent spot half size of eye; fifth dorsal ray longer than tenth dorsal ray.

Aequidens vittata [23] (Heckel)

AEQUIDENS TETRAMERUS (Heckel)

Acara tetramerus Heckel, Ann. Wien Mus. Naturg., vol. 2, p. 341, 1840.

Acara diadema Heckel, Ann. Wien Mus. Naturg., vol. 2, p. 344, 1840 (Río Negro in Venezuela).

AEQUIDENS PULCHER (Gill)

Mojarro

Cychlasoma pulchrum Gill, Ann. Lyceum Nat. Hist. New York, vol. 6, p. 382 (22), 1858 (Trinidad).

Aequidens latifrons Eigenmann, Mem. Carnegie Mus., vol. 9, No. 1, p. 197, pl. 33, fig. 1, 1922 (Colombia and Panama, in Magdalena, Atrato, and San Juan Basins).—Myers, Stanford Ichthyol Bull., vol. 2, No. 4, p. 114, 1942 (Quebrado Sargento, tributary Rio Limón, north of Maracaibo).

Aequidens pulcher Eigenmann, Indiana Univ. Studies, vol. 7, No. 44, p. 13, 1920 (Isla del Buro, Lago Valencia; Maracay, Río Bue, Venezuela).—Pearse,

[23] Not yet reported from Venezuela.

Univ. Wisconsin Studies, No. 1, p. 18, 1920 (mouth Río Bue, Lake Valencia, Venezuela).

Aequidens tetramerus BEEBE, in part, Zoologica, vol. 28, No. 3, pp. 13–16, pl. 1, 1943 (Caripito, Venezuela).

Acara vittata IHERING, Rev. Mus. Paulista, vol. 7, p. 310, 1907 (Río Cabriales, Venezuela).

Acara pulchra PELLEGRIN, Mem. Soc. Zool. France, vol. 16, p. 176, 1903 (Maracaibo).—REGAN, Ann. Mag. Nat. Hist., ser. 7, vol. 15, p. 335, 1905 (Venezuela); Proc. Zool. Soc. London, 1906, pt. 1, p. 392, pl. 25, fig. 1 (Venezuela).

Aequidens vittata FOWLER, Proc. Acad. Nat. Sci. Philadelphia, vol. 95, p. 264, 1943 (Cúcuta, Colombia, Maracaibo Basin). (The other specimen listed by Fowler from Florencia, Colombia, probably is not *vittata*.)

U.S.N.M. No. 121639, 81 specimens, 11 to 83 mm., from the Río San Pedro at bridge, Motatán system, March 20, 1942.

U.S.N.M. No. 121651, 108 specimens, 10 to 79 mm., Río San Juan near bridge, south of Mene Grande, March 17 and 20, 1942.

U.S.N.M. No. 121638, 7 specimens, 17.5 to 38 mm., Río Apón, about 35 km. south of Rosario, February 26, 1942.

U.S.N.M. No. 121642, 12 specimens, 11 to 98 mm., Lago Tulé, about 75 km. west of Maracaibo, March 1, 1942.

U.S.N.M. No. 121640, 2 specimens, Río San Ignacio, pool in drying up stream, 20 km. south of Rosario, February 26, 1942.

U.S.N.M. No. 121645, 4 specimens, 25 to 71 mm., Río Motatán, 8 km. below Motatán, March 24, 1942.

U.S.N.M. No. 121643, 6 specimens, 16 to 23 mm., Río Socuy, 3 km. above mouth, February 24, 1942.

U.S.N.M. No. 121657, 46 specimens, 21 to 101 mm., caño ½ mile west of Sinamaica, March 11, 1942.

U.S.N.M. No. 121647, 30 specimens, 11 to 79 mm., Río Machango at bridge south of Lagunillas, March 16, 1942.

U.S.N.M. No. 121650, 7 specimens, 20 to 57 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21, 1942.

U.S.N.M. No. 121655, 13 specimens, 61 to 80 mm., Salina Rica (brackish water), 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121656, a specimen, 10 mm., Caño de Sagua, 25 km. north of Sinamaica (salt water), March 12, 1942.

U.S.N.M. No. 121653, 15 specimens, 11 to 74 mm., Río Negro below mouth of Río Yasa, March 2, 1942.

U.S.N.M. No. 121654, 5 specimens, 17 to 25 mm., in creek below warm spring tributary to Río Machango, 20 km. above bridge south of Lagunillas, March 21, 1942.

U.S.N.M. No. 121644, 10 specimens, 26 to 50 mm., Río Machango, 20 km. above bridge south of Lagunillas, March 21, 1942.

U.S.N.M. No. 121646, 40 specimens, 16 to 65 mm., Río San Juan at bridge south of Rosario, February 26, 1942.

U.S.N.M. No. 121637, 2 specimens, 15 and 15.5 mm., Lago de Maracaibo opposite Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121648, 25 specimens, 8 to 81 mm., Ciénaga del Guanavana about 10 km. north of Sinamaica, March 11, 1942.

U.S.N.M. No. 121641, 4 specimens, 28 to 37 mm., Lago de Maracaibo at Maracaibo Yacht Club, February 27, 1942.

U.S.N.M. No. 121652, 4 specimens, 19 to 28 mm., Río Palmar at bridge, 70 km. southwest of Maracaibo, March 6, 1942.

U.S.N.M. No. 121649, 7 specimens, 13 to 33 mm., pond tributary to Río Gé, near Rosario, L. P. Schultz, W. W. Butcher, and B. C. Refshauge, March 8, 1942.

U.S.N.M. No. 121636, 16 specimens, 32 to 74 mm., Río Guárico and tributaries, between San Sebastián and San Casimiro, L. P. Schultz, G. Zuloaga, William Phelps, Jr., and R. Sherman, May 12, 1942.

The following collections were made by Brother Nicéforo María in the Catatumbo system of the Maracaibo Basin:

U.S.N.M. No. 100780, 1 specimen, 21 mm., Cúcuta, Colombia.

U.S.N.M. No. 101618, 1 specimen, 109 mm., Río Pamplonita, near Cúcuta.

I have examined the five specimens, 64 to 75 mm., from Caripito, collected by Dr. William Beebe, March 21, 1942, and reported upon by him (1943b) as *A. tetramerus* and I refer them to this species.

The Chicago Natural History Museum lent for report one specimen, their No. 42009, Río Cogollo, Sierra Perijá, Osgood and Conover, March 1920.

Color when alive consisted of several short irregular iridescent blue wavy lines below eye on operculum and lower side of head; the scales on front of body have bluish iridescent reflections; there is an orange tinge in the pale interspaces between the blackish vertical bars.

Genus PETENIA Günther

Petenia Günther, Catalogue of the fishes in the British Museum, vol. 4, p. 301, 1862. (Genotype, *Petenia splendida* Günther.)

Coquetaia Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 97, p. 133, 1945. (Genotype, *Coquetaia amploris* Fowler.)

PETENIA KRAUSSII Steindachner

Petenia kraussii Steindachner, Denkschr. Akad. Wiss. Wien, vol. 39, p. 28, pl. 1, figs. 2, 3, pl. 2, fig. 1, 1a, 1b, 1878 (Río Magdalena).—Pellegrin, Mem. Soc. Zool. France, vol. 16, p. 244, 1903 (Maracaibo).

Cichlosoma kraussi Regan, Ann. Mag. Nat. Hist., ser. 7, vol. 16, p. 339, 1905 (Venezuela).

Cichlasoma kraussi Myers, Stanford Ichthyol. Bull., vol. 2, No. 4, p. 114, 1942 (Quebrada Sargento tributary to Río Limón, north of Maracaibo).

U.S.N.M. No. 121625, 4 specimens, 71 to 127 mm. in standard length, Río San Juan near bridge south of Lagunillas, March 17 and 20, 1942.

U.S.N.M. No. 121628, 6 specimens, 35 to 103 mm., Lago de Maracaibo at Yacht Club, in brackish water, February 27 and March 5, 1942.

U.S.N.M. No. 121632, 2 specimens, 89 and 101 mm., Río San Pedro at bridge south of Lagunillas, March 20, 1942.

U.S.N.M. No. 121627, 8 specimens, 18 to 130 mm., Río Apón about 35 km. south of Rosario, February 26, 1942.

U.S.N.M. No. 121626, 78 specimens, 16 to 110 mm., Río Machango at bridge south of Lagunillas, March 16, 1942.

U.S.N.M. No. 121633, 4 specimens, 77 to 118 mm., Salina Rica, 5 km. north of Maracaibo in brackish water, February 20, 1942.

U.S.N.M. No. 121634, 1 specimen, 21 mm., Río Agua Caliente, 2 to 3 km. above Lago Maracaibo, May 1, 1942.

U.S.N.M. No. 121630, 37 specimens, 40 to 106 mm., Río Socuy, 3 km. above mouth, February 24, 1942.

U.S.N.M. No. 121631, 46 specimens, 13 to 48 mm., Río Machango, 20 km. above bridge, south of Lagunillas, March 21, 1942.

U.S.N.M. No. 121629, 57 specimens, 12 to 106 mm., Lago Tulé about 75 km. west of Maracaibo, March 1, 1942.

U.S.N.M. No. 121624, 3 specimens, 110 to 140 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121635, 4 specimens, 14 to 34 mm., pond tributary to Río Gé, near Rosario, March 8, 1942.

U.S.N.M. No. 121619, 15 specimens, 15 to 170 mm., Río Negro below mouth of Río Yasa, March 2, 1942.

U.S.N.M No. 121623, 16 specimens, 17 to 96 mm., Río Palmar at bridge 70 km. southwest of Maracaibo, March 6, 1942.

U.S.N.M. No. 121621, 28 specimens, 10 to 143 mm., Ciénaga del Guanavana about 10 km. north of Sinamaica, March 11, 1942.

U.S.N.M. No. 121622, 49 specimens, 30 to 171 mm., caño ½ mile west of Sinamaica, March 11, 1942.

TABLE 20.—*Measurements and counts made on species of* Petenia (*all measurements expressed in hundredths of the standard length*)

Characters	*myersi*		*kraussi*
	Holotype	Paratype	Maracaibo Basin, Venezuela
Standard length in millimeters	137.0	65.0	149.5
Length of head	37.9	40.0	40.1
Greatest depth of body	43.1	46.9	43.5
Length of snout	14.6	13.1	12.5
Diameter of eye	8.61	11.5	9.16
Width of interorbital space	10.2	9.23	10.7
Least width of preorbital	4.89	4.62	4.68
Postorbital length of head	15.7	16.9	19.1
Snout tip to rear end of maxillary	24.1	----	20.1
Snout to nostril	10.9	----	9.36
Eye to nostril	3.65	3.08	3.34
Length of caudal peduncle	17.7	14.2	13.0
Least depth of caudal peduncle	14.2	13.8	14.8
Length of fifth dorsal spine	12.4	16.5	12.0
Length of last dorsal spine	12.4	----	16.1
Longest ray of pelvics	31.0	31.5	34.1
Longest ray of pectorals	21.5	24.9	30.4
Distance out that caudal fin is scaled basally	13.9	11.5	21.4
Longest caudal fin ray	25.5	26.2	31.8
Dorsal rays	XV, 13	XV, 13	XVI, 11
Anal rays	V, 9	V, 9	VI, 10
Pectoral rays	ii, 13–ii, 13	ii, 13–ii, 13	ii, 13–ii, 13
Pelvic rays	I, 5–I, 5	I, 5–I, 5	I, 5–I, 5
Branched caudal fin rays	14	14	14
Scale rows below lateral line	32	32	32
Scales from dorsal origin to lateral line	6	6	7
Scales from pelvic base to lateral line	12	12	13
Pores in lateral line	18+13	18+11	20+10
Scales between lateral lines	2	2	2
Scales from base of last dorsal spine to lateral line and on base of dorsal	5+2	5+2	4+2
Zigzag row of scales around caudal peduncle	20	20	20

U.S.N.M. No. 121620, 98 specimens, 26 to 139 mm., Río Palmar near Totuma, about 100 km. southwest of Maracaibo, February 21, 1942.

Recently I described (Schultz, 1944d) a new species of *Petenia* from Colombia. In table 20 the species *P. kraussi* and *P. myersi* Schultz are compared. H. W. Fowler (Proc. Acad. Nat. Sci. Philadelphia, vol. 97, pp. 133–135, figs. 46, 47, 1945) described *Coquetaia amploris* from the Río Coquetá, but this is a synonym of *Petenia myersi* Schultz; they came from the same river.

TABLE 21.—*Fin ray counts made on* Petenia kraussii *from the Maracaibo Basin*

Dorsal rays			Anal rays		
XV, 10	XV, 11	XVI, 11	VI, 8	VI, 9	VII, 8
4	1	14	4	14	1

Genus CICHLASOMA Swainson

Cichlaurus SWAINSON, The natural history of fishes, vol. 2, p. 173, 1839 (no species listed).

Cichlasoma SWAINSON, The natural history of fishes, p. 230, 1839. (Genotype, *Labrus punctata* Bloch.)

KEY TO THE SPECIES OF CICHLASOMA

1*a*. Anal rays usually IV, 8 to 9; dorsal rays usually XV, 9 to 11; depth of body 1.75 to 2.5, head 2 ⅔ to 3; caudal rounded; a dark spot below rear of eye; black caudal spot on upper part of base of caudal fin and on base of upper caudal fin rays; a black band from eye to the black lateral blotch; about 8 blackish vertical bars, sometimes obscure.
Cichlasoma bimaculatum (Linnaeus)

1*b*. Anal rays usually V, 8 to 10; dorsal rays XV,12 or 13; depth of body 2, head 2.75; caudal rounded; a lengthwise band from eye to caudal base where it forms a spot---------- **Cichlasoma psittacum** (Heckel)

CICHLASOMA BIMACULATUM (Linnaeus)

Labrius bimaculatus LINNAEUS, Systema naturae, ed. 10, p. 285, 1758.

Cichlasoma bimaculatum REGAN, Proc. Zool. Soc. London, 1906, pt. 1, p. 392 (Venezuela).

Aequidens tetramerus (in part) BEEBE, Zoologica, vol. 28, No. 3, pp. 13–16, pl. 1, 1943 (Caripito, Venezuela).

Acara bimaculata PELLEGRIN, Bull. Mus. Hist. Nat. Paris, vol. 5, p. 158, 1899 (Apure River, Venezuela).

Three specimens, 19 to 60 mm., Caripito, William Beebe, 1942.

CICHLASOMA PSITTACUM (Heckel)

Heros psittacus HECKEL, Ann. Wien. Mus. Naturg., vol. 2, p. 369, 1840.

Cichlasoma psittacum REGAN, Ann. Mag. Nat. Hist., ser. 7, vol. 16, p. 324, 1905 (Río Orinoco).—HASEMAN, Ann. Carnegie Mus., vol. 7, p. 343, 1911 (Orinoco rivers).

Family POMACENTRIDAE: Desmoiselles; Damselfishes

Genus ABUDEFDUF Forskål

Abudefduf Forskål, Descriptiones animalium, p. 59, 1775. (Genotype, *Chaetodon sordidus* Forskål.)

ABUDEFDUF SAXATILIS (Linnaeus)

Chaetodon saxatilis Linnaeus, Systema naturae, ed. 10, p. 276, 1758 ("India").
Abudefduf saxatilis marginatus Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 100, 1919 (La Guaira, Venezuela).

Family LABRIDAE: Wrasses

Genus HALICHOERES Rüppell

Halichoeres Rüppell, Neue Wirbelthiere, Fische, p. 14, 1835. (Genotype, *Halichoeres bimaculatus* Rüppell.)

HALICHOERES RADIATUS (Linnaeus)

Doncella

Labrus radiatus Linnaeus, Systema naturae, ed. 10, p. 288, 1758 (America).
Halichoeres radiatus Röhl, Fauna descriptiva de Venezuela, p. 408, fig. 225, 1942 (coast of Venezuela; Lago de Maracaibo).

Genus LACHNOLAIMUS Valenciennes

Lachnolaimus Valenciennes, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 13, p. 200, 1839. (Genotype, *L. aigula* Cuvier and Valenciennes = *Labrus maximus* Walbaum).

LACHNOLAIMUS MAXIMUS (Walbaum)

Perro

Labrus maximus Walbaum, Artedi's Bibliotheca ichthyologicae, vol. 3, p. 261, 1792.
Lachnolaimus maximus Röhl, Fauna descriptiva de Venezuela, p. 408, fig. 224, 1942 (coast of Venezuela).

Genus BODIANUS Bloch

Bodianus Bloch, Naturgeschicte der ausländischen Fische, vol. 4, p. 48, 1790. (Genotype, *Bodianus bodianus* Bloch.) (Ref. copied.)

BODIANUS RUFUS (Linnaeus)

Labrus rufus Linnaeus, Systema naturae, ed. 10, p. 284, 1758 (America).
Cossyphus rufus Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 103, 1919 (Puerto Cabello, Venezuela)

Family SCARIDAE: Parrotfishes; Loros

No key is attempted for this family because there are too few specimens available from Venezuelan waters. The reader is referred to Meek and Hildebrand's "The Marine Fishes of Panama," part 3, pp. 732 to 760, 1928 for keys that will aid in the identification of the

parrotfishes. Also see Longley and Hildebrand's "Systematic Catalogue of the Fishes of Tortugas, Florida," Carnegie Institution of Washington Publication No. 535, pp. 205–221, 1941. I am listing below the species reported from Venezuela without attempting to straighten out the synonymy.

Genus SPARISOMA Swainson

Sparisoma Swainson, The natural history and classification of fishes, vol. 2, p. 227, 1839. (Genotype, *Sparus abildgaardi* Bloch.)

The following collection I am unable to identify with certainty down to species:

U.S.N.M. No. 123176, 7 specimens, 27 to 40 mm., Estanques Bay, U. S. S. *Niagara*, February 20, 1925.

SPARISOMA ABILDGAARDI (Bloch)

Sparus abildgaardi Bloch, Naturgeschichte der ausländischen Fische, vol. 5, p. 22, pl. 259, 1791 (America) (ref. copied).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 112, 1919 (Venezuela).

SPARISOMA FLAVESCENS (Bloch and Schneider)

Scarus flavescens Bloch and Schneider, Systema ichthyologiae, p. 290, 1801 (Cuba).

U.S.N.M. No. 123175, 4 specimens, 29 to 70 mm., from Cape San Román, U. S. S. *Niagara*, April 2, 1925.

Genus SCARUS Forskål

Scarus Forskål, Descriptiones animalium, p. 25, 1775. (Genotype, *Scarus psittacus* Forskål.)

SCARUS PUNCTULATUS (Cuvier and Valenciennes)

Scarus punctulatus Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 14, p. 195, 1839 (Martinique).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 115, 1919 (Puerto Cabello, Venezuela).

SCARUS CROICENSIS Bloch

Scarus croicensis Bloch, Naturgeschichte der ausländischen Fische, vol. 4, p. 27, pl. 221, 1790 (St. Croix).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 116, 1919 (Venezuela).

SCARUS EVERMANNI Jordan

Scarus evermanni Jordan, *in* Jordan and Evermann, Proc. U. S. Nat. Mus., vol. 9, p. 469, 1887 (Snapper Banks off Tampa Bay).—Metzelaar, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 116, 1919 (Venezuela).

Longley and Hildebrand (see reference above) suggest this species may be *Scarus croicensis*.

SCARUS VIRIDIS (Bonnaterre)

LORO

Scarus viridis BONNATERRE, Tableau encyclopédique, Ichthyologie, vol. 6, p. 96, 1788 (Bahamas) (ref. copied).

Sparisoma viridis RÖHL, Fauna descriptiva de Venezuela, p. 409, 1942 (coast of Venezuela).

Suborder BLENNIOIDEA

Family CLINIDAE: Blennies

The specimens and number of species from Venezuela are too few to warrant the construction of a key for their identification. Instead, the reader is referred to Meek and Hildebrand's "The Marine Fishes of Panama," part 3, pp. 928–953, 1928, and to Longley and Hildebrand's "Systematic Catalogue of the Fishes of Tortugas, Florida," Carnegie Inst. Washington Publ. No. 535, pp. 246–276, 1941, for aid in identification of the blennies likely to occur in Venezuela.

Genus LABRISOMUS Swainson

Labrisomus SWAINSON, The natural history and classification of fishes, vol. 2, p. 277, 1839. (Genotype, *Clinus pectinifer* Cuvier and Valenciennes=*Clinus nuchipinnis* Quoy and Gaimard.) (Ref. copied.)

LABRISOMUS NUCHIPINNIS (Quoy and Gaimard)

Clinus nuchipinnis QUOY AND GAIMARD, Voyage autour du monde . . . *L'Uranie* et *La Physicienne*, p. 255, 1824 (Rio de Janeiro) (ref. copied).—METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies 1904–1905, p. 154, 1919 (Venezuela).

U.S.N.M. Nos. 78251 and 78252, Puerto Cabello, J. N. Rose.

U.S.N.M. No. 123173, 1 specimen, 46.5 mm., Estanques Bay, U. S. S. *Niagara*, February 20, 1925.

U.S.N.M. No. 123174, 1 specimen, 61 mm., Cape San Román, U. S. S. *Niagara*, April 2, 1925.

Genus PARACLINUS Mocquard

Paraclinus MOCQUARD, Bull. Soc. Philom. Paris, ser. 8, vol. 1, No. 1, p. 41, 1889 (substitute name for *Acanthoclinus* Mocquard, 1886. (Genotype, *Acanthoclinus chaperi* Mocquard.)

For synonymy of this genus see Storey (1940, pp. 85–86).

PARACLINUS NIGRIPINNIS (Steindachner)

Clinus nigripinnis STEINDACHNER, Sitzb. Akad. Wiss. Wien, vol. 50, p. 45, 1867 (Barbados).

U.S.N.M. No. 123172, a specimen, 34 mm., from Cape San Román, U. S. S. *Niagara*, April 2, 1925.

PARACLINUS CHAPERI (Mocquard)

Acanthoclinus chaperi MOCQUARD, Bull. Soc. Philom. Paris, ser. 7, vol. 10, pp. 18–20, 1886 (Guanta Bay, near Barcelona, Venezuela).—Storey, Copeia, No. 2, p. 82, 1940 (Guanta Bay).

Paraclinus chaperi METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies, 1904–1905, p. 156, fig. 50, 1919 (Venezuela).—Storey, Copeia, No. 2, pp. 82, 86, 1940 (Guanta Bay, near Barcelona, Venezuela).

Genus MALACOCTENUS Gill

Malacoctenus GILL, Proc. Acad. Nat. Sci. Philadelphia, 1860, p. 103. (Genotype, *Clinus delalandii* Cuvier and Valenciennes.)

MALACOCTENUS DELALANDII (Valenciennes)

Clinus delalandii VALENCIENNES, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 11, p. 378, 1836 (Brazil).

U.S.N.M. No. 123171, 5 specimens, 37.5 to 55 mm., Cape San Román, U. S. S. *Niagara*, April 2, 1925.

U.S.N.M. No. 123170, 2 specimens, dried, 45 and 52 mm., Gulf of Venezuela, U. S. S. *Niagara*, April 4, 1925.

Suborder TRICHIUROIDEA

Family TRICHIURIDAE: Hairtails

Genus TRICHIURUS Linnaeus

Trichiurus LINNAEUS, Systema naturae, ed. 10, p. 246, 1758. (Genotype, *Trichiurus lepturus* Linnaeus.)

TRICHIURUS LEPTURUS Linnaeus

Trichiurus lepturus LINNAEUS, Systema naturae, ed. 10, p. 246, 1758 (America).—RÖHL, Fauna descriptiva de Venezuela, p. 396, fig. 207, 1942 (coast of Venezuela).

U.S.N.M. No. 123079, 3 specimens, 180 to 193 mm. in total length, from Jacuque Point, U. S. S. *Niagara*, January 26, 1925.

Suborder SCOMBROIDEA

Family SCOMBRIDAE

The Venezuelan material of this family is so limited that I have not attempted to make a key. Instead I am copying the "Key to the Genera" which appears on pages 307–308, part I, of Meek and Hildebrand's "The Marine Fishes of Panama." This key includes those genera of scombroid fishes most likely to be found along the coast of Venezuela.

1*a*. Maxillary wholly concealed by preorbital; no median keel on caudal peduncle. **Scomber**[24] Linnaeus

1*b*. Maxillary not wholly concealed by preorbital; median keel on caudal peduncle more or less developed.

2*a*. Scales present on anterior part of body only, forming a corselet, the rest of body naked; palatine teeth wanting.

3*a*. Dorsal fins close together, contiguous; the first with XV or XVI spines. **Gymnosarda**[24] Gill

3*b*. Dorsal fins far apart, the interval between them nearly equaling the length of the head; the first with IX or X spines____**Auxis**[24] Cuvier

[24] Not yet recorded from Venezuela.

2*b*. Entire body covered with scales, sometimes very small or rudimentary, forming a corselet or not; palatine teeth present.

4*a*. Snout of moderate length, not beaklike; maxillary posteriorly exposed, not concealed by preorbital.

5*a*. Teeth on jaws small, conical, not compressed; gill rakers long and slender, numerous, 20 or more on lower limb of first arch.

6*a*. Body oblong, compressed, not exceptionally robust; pectoral fins of moderate length, always notably shorter than head.

Thunnus South

6*b*. Body short, slightly compressed, very robust; pectoral fins of extreme length, much longer than head ..... **Germo**[24] Jordan

5*b*. Teeth on jaws rather strong, more or less compressed, sometimes triangular, with sharp cutting edges; gill rakers rather short, fewer than 20 on lower limb of first arch.

7*a*. Vomer toothless; palatine teeth in a single series, similar in size and shape to those on jaws; first dorsal long, with XVIII to XXII spines; scales of pectoral region forming a rather distinct corselet ..... **Sarda** Cuvier

7*b*. Vomer and palatines with bands of granular teeth; first dorsal rather short, with XIV to XVIII feeble spines; scales not forming corselet ..... **Scomberomorus** Lacepède

4*b*. Snout extremely long, beaklike, longer than rest of head; maxillary posteriorly concealed by preorbital ..... **Acanthocybium** Gill

Genus THUNNUS South

Thunnus South, Encyclopedia metropolitana, vol. 5, p. 620, 1845. (Genotype *Scomber thynnus* Linnaeus.) (Substitute for *Thynnus* Cuvier, preoccupied.) (Ref. copied.)

THUNNUS THYNNUS (Linnaeus)

Tuna; Albacora o Atún

Scomber thynnus Linnaeus, Systema naturae, ed. 10, p. 297, 1758 (Europe).

Thunnus thynnus Röhl, Fauna descriptiva de Venezuela, p. 394, fig. 203, 1942 (coast of Venezuela).

Genus SARDA Cuvier

Sarda Cuvier, Le règne animal, ed. 2, vol. 2, p. 199, 1829. (Genotype, *Scomber sarda* Bloch.)

SARDA SARDA (Bloch)

Bonito

Scomber sarda Bloch, Ichthyologie, ou Histoire naturelle des poissons, vol. 10, p. 35, pl. 334, 1797 (Europe).

Sarda sarda Röhl, Fauna descriptiva de Venezuela, p. 394, 1942 (off coast of Venezuela).

Genus SCOMBEROMORUS Lacépède

Scomberomorus Lacepède, Histoire naturelle des poissons, vol. 3, p. 292, 1802. (Genotype, *Scomberomorus plumieri* Lacépède=*Scomber regalis* Bloch).

[24] Not yet recorded from Venezuela.

KEY TO THE SPECIES OF SCOMBEROMORUS LIKELY TO OCCUR ALONG THE COAST OF VENEZUELA [25]

1*a*. Body very slender, its depth 5.5 to 6.25 in its length; gill rakers extremely short, not more than one-fourth length of eye in adult, 7 or 8 more or less developed on lower limb of first arch; lateral line with an abrupt downward curve under second dorsal; sides in adult plain silvery, without spots or streaks, in young with yellowish spots; dorsal rays about XIV, 17,9; anal II,14 to 17,9 or 10 ..... **Scomberomorus cavalla** [26] (Cuvier)

1*b*. Body deeper, its depth usually less than 5.5 in its length; gill rakers longer, more numerous, about 10 to 12 on lower limb of first arch; lateral line descending gradually, not with an abrupt curve; sides with dark spots or dark streaks; dorsal rays about XVII or XVIII,15 to 18, 8 or 9; anal II,14 to 17,8 or 9.

2*a*. Pectoral fins covered with small scales almost to their tips; sides with one or two longitudinal dark streaks and a few rows of elliptical spots. **Scomberomorus regalis** (Bloch)

2*b*. Pectoral fins without scales; sides with bronzy spots, but without dark streaks ..... **Scomberomorus maculatus** (Mitchill)

SCOMBEROMORUS REGALIS (Bloch)

Scomber regalis Bloch, Ichthyologie, ou Histoire naturelle des poissons, vol. 10, p. 31, pl. 333, 1797.

Scomberomorus regalis Röhl, Fauna descriptiva de Venezuela, p. 395, fig. 206, 1942 (coast of Venezuela).

SCOMBEROMORUS MACULATUS (Mitchill)

Spanish Mackerel; Carite

Scomber maculatus Mitchill, Trans. Lit. Philos. Soc. New York, vol. 1, p. 426, 1815.

Scomberomorus maculatus Röhl, Fauna descriptiva de Venezuela, p. 394, fig. 205, 1942 (coast of Venezuela).

U.S.N.M. No. 121802, 2 specimens, 280 and 312 mm., market at Maracaibo, May 15, 1942.

The following specimen was identified by Dr. S. F. Hildebrand:

U.S.N.M. No. 123081, 1 specimen, 340 mm., from Amuay Bay, May 15, 1925.

Genus ACANTHOCYBIUM Gill

Acanthocybium Gill, Proc. Acad. Nat. Sci. Philadephia, 1862, p. 125. (Genotype, *Cybium sara* Bennett.)

ACANTHOCYBIUM SOLANDRI (Cuvier)

Wahoo; Peto

Cybium solandri Cuvier, *in* Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 8, p. 192, 1831.

Acanthocybium solandri Röhl, Fauna descriptiva de Venezuela, p. 394, fig. 204, 1942 (coast of Venezuela).

[25] Modified after Meek and Hildebrand.

[26] Not yet reported from Venezuela.

Family ISTIOPHORIDAE: Sailfishes

Genus ISTIOPHORUS Lacepède

Istiophorus Lacepède, Histoire naturelle des poissons, vol. 3, p. 374, 1803. (Genotype, *Istiophorus gladifer* Lacepède=*Scomber gladius* Broussonet.) (Ref. copied.)

ISTIOPHORUS AMERICANUS (Cuvier and Valenciennes)

Sailfish; Aguja vela

Histiophorus americanus Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 8, p. 303, 1831 (Brazil).
Istiophorus nigricans Röhl, Fauna descriptiva de Venezuela, p. 396, fig. 208, 1942 (coast of Venezuela).

Family XIPHIIDAE: Swordfishes

Genus XIPHIAS Linnaeus

Xiphias Linnaeus, Systema naturae, ed. 10, p. 248, 1758. (Genotype, *Xiphias gladius* Linnaeus.)

XIPHIAS GLADIUS Linnaeus

Swordfish; Emperador, Espadón, o Pez espada

Xiphias gladius Linnaeus, Systema naturae, ed. 10, p. 248, 1758 (Europe).
Tetraopterus imperator Röhl, Fauna descriptiva de Venezuela, p. 397, fig. 209, 1942 (coast of Venezuela).

Suborder Stromateoidea

Family STROMATEIDAE: Harvestfishes

Genus PEPRILUS Cuvier

Peprilus Cuvier, Le règne animal, ed. 2, vol. 2, p. 214, 1829. (Genotype, *Stromateus longipinnis* Mitchill=*Stromateus paru* Linnaeus.)

PEPRILUS PARU (Linnaeus)

Harvestfish: Palometa de mar

Stromateus paru Linnaeus, Systema naturae, ed. 10, p. 248, 1758 (America).
Peprilus paru Röhl, Fauna descriptiva de Venezuela, p. 401, fig. 215, 1942 (coast of Venezuela).

U.S.N.M. No. 123044, 5 specimens, 54 to 68 mm. in standard length, Piedras Bay, U. S. S. *Niagara*, March 14, 1925.

Suborder Gobiformes

Upon my return from Venezuela in 1942 I turned over to Isaac Ginsburg for study all the gobiid fishes that I collected, along with a large collection made by Dr. F. F. Bond. All the identifications reported upon for the two following families, Eleotridae and Gobiidae, were made by Mr. Ginsburg, and to him I extend my appreciation of

his work and of the opportunity to include his identifications in this report. These specimens will be fully treated some time in the future in a big work on American gobies that he has been preparing for a number of years, and I shall not attempt to make a key to this group.

Family ELEOTRIDAE

Genus EROTELIS Poey

Erotelis Poey, Memorias sobre la historia natural de la isla de Cuba, vol. 2, p. 273, 1860. (Genotype, *E. valenciennesi* Poey=*Eleotris smaragdus* Cuvier and Valenciennes.)

EROTELIS SMARAGDUS (Cuvier and Valenciennes)

Eleotris smaragdus Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 231, 1837 (Cuba).

U. S. N. M. No. 123145, 1 specimen, Point Macollo, U.S.S. *Niagara*, April 19, 1925.

Genus MICROPHILYPNUS Myers

Microphilypnus Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 134. 1927. (Genotype, *Microphilypnus ternetzi* Myers.)

MICROPHILYPNUS TERNETZI Myers

Microphilypnus ternetzi Myers, Bull. Mus. Comp. Zool., vol. 68, No. 3, p. 134 1927 (Caño de Quiribana, near Caicara, Venezuela).

Genus DORMITATOR Gill

Dormitator Gill, Proc. Acad. Nat. Sci. Philadelphia, vol. 14, p. 240, 1862. (Genotype, *Eleotris gundlachi* Poey.)

DORMITATOR MACULATUS (Bloch)

Mapo

Sciaena maculata Bloch, Ichthyologie, ou Histoire naturelle des poissons, pl. 299, fig. 2, 1785 (West Indies) ref. copied).

The following collections were made by F. F. Bond:

26 specimens, 18 to 63 mm. in standard length, Río Cumboto, near Ocumare, January 5, 1938.

1 specimen, 14 mm., coastal lagoons, 15 km. north of Maracaibo, April 6, 1938.

9 specimens, 13 to 21 mm., Río Curiepe at Higuerote, February 2, 1939.

53 specimens, 13 to 26 mm., Río Guaiguaza, 3 km. west of Puerto Cabello, January 15, 1938.

2 specimens, 10.5 and 19 mm., Río Noguera at Noguera, January 13, 1938.

10 specimens, 12.5 to 30 mm., Río Borburata, 3 km. east of Puerto Cabello.

1 specimen, 15 mm., Río Cambur, tributary of Lago de Valencia, January 13, 1938.

Genus GOBIOMORUS Lacepède

Gobiomorus Lacepède, Histoire naturelle des poissons, vol. 2, p. 583, 1800. (Genotype, *Gobiomorus dormitor* Lacepède.) (Ref. copied.)

GOBIOMORUS DORMITOR Lacepède

GUAVINA

Gobiomorus dormitor LACEPÈDE, Histoire naturelle des poissons, vol. 2, p. 583, 1800 (Martinique) (ref. copied).

The following collections were made by F. F. Bond. The specimens were identified by Isaac Ginsburg:

2 specimens, 69 to 71 mm., lagoon 3 km. west of Cumaná, March 26, 1939.

1 specimen, 50.5 mm., Río Borburata, 3 km. east of Puerto Cabello, January 15, 1939.

1 specimen, 18 mm., Caño Cambur, tributary of Lago de Valencia, 11 km. southeast of Valencia, January 13, 1938.

Genus ELEOTRIS Bloch and Schneider

Eleotris BLOCH AND SCHNEIDER, Systema ichthyologiae, p. 65, 1801. (Genotype, *Gobius pisonis* Gmelin.) (Ref. copied.)

ELEOTRIS AMBLYOPSIS (Cope)

GUAVINA

Culius amblyopsis COPE, Trans. Amer. Philos. Soc., vol. 14, p. 473, 1871 (Surinam) (ref. copied).

The following collections were made by F. F. Bond:

2 specimens, 19 and 30 mm. in standard length, Río Borburata, 3 km. east of Puerto Cabello, January 15, 1938.

1 specimen, 64.5 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

2 specimens, 47 and 49 mm., Río Cumboto, near mouth, 2 km. northwest of Ocumare, May 5, 1939.

6 specimens, 15 to 65 mm., Río Guaiguaza, 3 km. west of Puerto Cabello, January 15, 1938.

4 specimens, 29 to 59 mm., Río Sanchón, 5 km. west of Tavorda, January 26, 1938.

ELEOTRIS PISONIS (Gmelin)

GUAVINA

Gobius pisonis GMELIN, Systema naturae, p. 1206, 1789 (Río Almendares, Cuba) (ref. copied).

U.S.N.M. No. 123144, 2 specimens, Point Macolla, U.S.S. *Niagara*, April 19, 1925.

U.S.N.M. Nos. 123155 and 123156, 3 specimens, Macuto, Lyon and Robinson, August 2, 1900.

The following collections were made by F. F. Bond:

4 specimens, 26 to 80 mm. in standard length, Río Cumboto, near mouth, 2 km. northwest of Ocumare, May 5, 1939.

2 specimens, 63 and 76 mm., Río Guaiguaza, 3 km. west of Puerto Cabello, January 15, 1938.

1 specimen, 30 mm., Río Cumboto near Ocumare, January 5, 1938.

1 specimen, 49 mm., saline lagoon, El Cable at Carúpano, March 30, 1939.

7 specimens, 30 to 68 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

Family GOBIIDAE

Genus GARMANNIA Jordan and Evermann

Garmannia Jordan and Evermann, Proc. California Acad. Sci., ser. 2, vol. 5, p. 497, 1895. (Genotype, *Garmannia paradoxa* [Günther]=*Gobius paradoxus* Günther.)

All the specimens of this genus that I collected were reported upon by Isaac Ginsburg (1944).

GARMANNIA SCHULTZI Ginsburg

Garmannia schultzi Ginsburg, Journ. Washington Acad. Sci., vol. 34, p. 375, 1944 (Lago de Maracaibo; 7 km. south of Maracaibo, Maracaibo Yacht Club; Salina Rica north of Maracaibo; Ciénaga del Guanavana north of Sinamaica).

U.S.N.M. No. 121546 and 121547 (holotype and paratypes) 34 specimens, from Lago de Maracaibo 7 km. south of Maracaibo, March 6, 1942.

U.S.N.M. No. 121548, 7 specimens, from Lago de Maracaibo opposite Salina Rica, February 20, 1942.

U.S.N.M. No. 121549 and 121550, 3 and 4 specimens, from Lago de Maracaibo at Yacht Club, March 5 and May 16, 1942, respectively.

U.S.N.M. No. 121552, 3 specimens, from Ciénaga del Guanavana, 12 km. north of Sinamaica, March 11, 1942.

GARMANNIA SPES Ginsburg

Garmannia spes Ginsburg, Journ. Washington Acad. Sci., vol. 29, p. 62, 1939 (Canal Zone, Panama); vol. 34, No. 11, p. 377, 1944 (caño west of Sinamaica, Venezuela).

A collection of 107 specimens, U.S.N.M. No. 121551, was made by Leonard P. Schultz on March 11, 1942, in a caño about ¾ km. west of Sinamaica.

Genus EVORTHODUS Gill

Evorthodus Gill, Proc. Acad. Nat. Sci. Philadelphia, vol. 11, p. 195, 1859. (Genotype, *Evorthodus breviceps* Gill=*Gobius lyricus* Girard.)

EVORTHODUS LYRICUS (Girard)

Gobius lyricus Girard, Proc. Acad. Nat. Sci. Philadelphia, vol. 10, p. 169, 1858 (Rio Brazos, Tex.).

U.S.N.M. No. 121545, 1 specimen, caño at Los Monitos, Río Limón system, March 11, 1942.

The following collections were made by F. F. Bond:

9 specimens, 35 to 76 mm., Río Borburata at mouth, 3 km. east of Puerto Cabello, at Gañanga, January 15, 1938.

5 specimens, 46 to 60 mm., Río Cumboto near Ocumare, January 6, 1938.

3 specimens, 21 to 89 mm., saline lagoon, El Cable at Carúpano, March 30, 1939.

29 specimens, 16 to 58 mm., Río Curiepe at Higuerote, February 2, 1939.

4 specimens, 44 to 52 mm., Río Guaiguaza, 3 km. west of Puerto Cabello, January 15, 1938.

6 specimens, 33 to 53 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

3 specimens, 48 to 57 mm., Laguna del Río Capatárida at mouth, 5 km. north of Capatárida, March 21, 1938.

15 specimens, 21 to 38 mm., Río Yaracuy at mouth, 45 km. northwest of Puerto Cabello, January 28, 1938.

2 specimens, 26 and 31 mm., Río Alpargatón, 5 km. north of Morón, January 28, 1938.

1 specimen, 77 mm., Río Cumboto near mouth, 2 km. northwest of Ocumare, May 5, 1939.

Genus BATHYGOBIUS Bleeker

Bathygobius Bleeker, Arch. Néerl. Sci., Nat., vol. 13, p. 54, 1878. (Genotype, *Gobius nebulo-punctatus* Rüppell=*Gobius fastiatus* Rüppell.)

BATHYGOBIUS SOPORATOR (Cuvier and Valenciennes)

Gobius soporator Cuvier and Valenciennes, Histoire naturelle des poissons, vol. 12, p. 56, 1837 (Martinique) (ref. copied).

U.S.N.M. No. 121543, 43 specimens, from Lago de Maracaibo at Maracaibo Yacht Club, May 16.

U.S.N.M. No. 121544, 2 specimens, from Lago de Maracaibo at Yacht Club, February 27.

Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939, 1 specimen, 70 mm.

Saline lagoon, El Cable at Carúpano, F. F. Bond, March 30, 1939, 1 specimen, 50 mm.

Genus GOBIONELLUS Girard

Gobionellus Girard, Proc. Acad. Nat. Sci. Philadelphia, vol. 10, p. 168, 1858. (Genotype, *Gobionellus hastatus* Girard.)

GOBIONELLUS BOLEOSOMA (Jordan and Gilbert)

Gobius boleosoma Jordan and Gilbert, Proc. U. S. Nat. Mus., vol. 5, p. 295, 1882 (Laguna Grande, Pensacola, Fla.).

U.S.N.M. No. 123273, 1 specimen, 32 mm., Point Macolla, April 19, 1925.

2 specimens, 31 and 37 mm., Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

4 specimens, 42 to 48 mm., Laguna del Río Capatárida, at mouth, 5 km. north of Capatárida, F. F. Bond, March 21, 1939, 4 specimens, 42 to 48 mm.

1 specimen, 39 mm., Río Borburata at mouth, 3 km. east of Puerto Cabello at Gañanga, F. F. Bond, January 15, 1938.

GOBIONELLUS CLAYTONII (Meek)

Gobius claytonii Meek, Publ. Field Columbian Mus. (Zool.), vol. 3, p. 121, 1902 (La Antigua).

33 specimens, 28 to 86 mm., saline lagoon, El Cable at Carúpano, F. F. Bond, March 30, 1939.

1 specimen, 40 mm., Río Macarupano, 5 km. southeast of Carúpano, F. F. Bond.

1 specimen, 31 mm., coastal lagoon, 15 km. northeast of Maracaibo, F. F. Bond, April 6, 1938.

Genus AWAOUS Steindachner

Awaous Steindachner, Sitzb. Akad. Wiss. Wien, vol. 42, p. 289, 1860. (Genotype, *Gobius ocellaris* Cuvier and Valenciennes.)

AWAOUS TAJASICA (Lichtenstein)

GUAVINA HORERA

Gobius tajasica LICHTENSTEIN, Abh. Akad. Wiss. Berlin, 1822, p. 273 (Brazil).

The following collections were made by F. F. Bond:

4 specimens, 25 to 206 mm., Río Cumboto, near Ocumare, January 5, 1938.

4 specimens, 60 to 121 mm., Río Agua Caliente, at Tavorda, 6 km. west of Puerto Cabello, January 15, 1938.

1 specimen, 171 mm., Río San Esteban at San Esteban near Puerto Cabello, December 25, 1937.

9 specimens, 30 to 68 mm., Río Cumboto near mouth, 2 km. northwest of Ocumare, May 5, 1939.

14 specimens, 18 to 70 mm., Río Guaiguaza, 3 km. west of Puerto Cabello, January 15, 1938.

1 specimen, 114 mm., a tributary of Río Manzanares, 12 km. northwest of Cumanacoa, March 26, 1939.

4 specimens, 23 to 92 mm., Río Sanchón, 5 km. west of Tavorda, January 26, 1938.

2 specimens, 19 to 39 mm., Río Borburata, at mouth, 3 km. east of Puerto Cabello at Gañanga, January 15, 1938.

1 specimen, 24 mm., Río Yaracuy, 8 km. southeast of San Felipe, January 27, 1938.

1 specimen, 16 mm., Río Curiepe at Higuerote, February 2, 1939.

Genus SICYDIUM Cuvier and Valenciennes

Sicydium CUVIER AND VALENCIENNES, Histoire naturelle des poissons, vol. 12, p. 168, 1837. (Genotype, *Gobius plumieri* Bloch.) (Ref. copied.)

SICYDIUM PUNCTATUM Perugia

SIRAJO

Sicydium punctatum PERUGIA, Ann. Mus. Civ. Storia Nat. Genova, ser. 2, vol. 16, p. 18, 1896 (Martinique) (ref. copied).

Sicydium montanum HUBBS, Proc. Biol. Soc. Washington, vol. 33, p. 89, 1920 (mountain brook at Macuto, Venezuela).

U.S.N.M. No. 122452, 1 specimen, Macuto, Lyon and Robinson, August 2, 1900.

The following collections were made by F. F. Bond:

1 specimen, 22 mm., Río Guataparo, tributary Río Paito to Río Paz, 8 miles west of Valencia, January 13, 1839.

1 specimen, 22 mm., lagoon 3 km. northwest of Petare, 15 km. east of Caracas, January 15, 1939.

1 specimen, 75 mm., saline lagoon, El Cable at Carúpano, March 30, 1939.

2 specimens, 43 and 46 mm., stream tributary to Río San Pedrito, 55 km. east of Barcelona, March 25, 1939.

21 specimens, 25 to 75 mm., Río Cerro Grande, 10 km. east of Macuto, December 22, 1937.

11 specimens, 23 to 58 mm., Río Cumboto near Ocumare, January 5, 1938.

5 specimens, 29 to 45 mm., Río Cumboto near mouth, 2 km. northwest of Ocumare, May 5, 1939.

SICYDIUM PLUMIERI (Bloch)

SIRAJO

Gobius plumieri BLOCH, Ichthyologie, ou Histoire naturelle des poissons, p. 125, pl. 178, fig. 3, 1797 (Martinique) (ref. copied).

U.S.N.M. Nos. 93823 and 93824, 3 specimens, 77 to 83 and 94 mm., respectively, from Macuto, Lyon and Robinson, August 12, 1900.

U.S.N.M. No. 122454, 6 specimens, Macuto, Lyon and Robinson, August 2, 1900.

1 specimen, 39 mm., Río Cerro Grande, 10 km. east of Macuto, F. F. Bond, December 22, 1937.

17 specimens, 45 to 104 mm., Río Cumboto near Ocumare, F. F. Bond, January 5, 1938.

Order SCLEROPAREIOIDEA

Family SCORPAENIDAE: Scorpionfishes

Genus SCORPAENA Linnaeus

Scorpaena LINNAEUS, Systema naturae, ed. 10, p. 266, 1758. (Genotype, *Scorpaena porcus* Linnaeus.)

SCORPAENA PLUMIERI Bloch

RASCACIO

Scorpaena plumieri BLOCH, Vet.-Acad. Nya Handl., vol. 10, p. 234, 1789 (Martinique) (ref. copied).—GUNTER, Copeia, 1941, No. 2, p. 119 (Venezuela); 1942, No. 2, p. 106 (Venezuela).

U.S.N.M. No. 123197, 1 specimen, 47 mm. in standard length, from Cape San Román, U. S. S. *Niagara* April 2, 1925.

U.S.N.M. No. 123196, 1 specimen, 26 mm., from Jacuque Point, U. S. S. *Niagara*, January 26, 1925.

Family TRIGLIDAE: Gurnards; Sea-robins

Genus PRIONOTUS Lacepède

Prionotus LACEPÈDE, Histoire naturelle des poissons, vol. 3, p. 336, 1802. (Genotype, *Trigla evolans* Linnaeus.) (Ref. copied.)

PRIONOTUS PUNCTATUS (Bloch)

RUBIO; VOLADOR; GALLINA DEL MAR

Trigla punctata BLOCH, Naturgeschichte der ausländischen Fische, vol. 7, p. 125, pl. 353, 1793 (Martinique) (ref. copied).

Prionotus punctatus METZELAAR, Report on the fishes collected by Dr. J. Boeke in the Dutch West Indies in 1904–1905, p. 147, 1919 (Venezuela).—RÖHL, Fauna descriptiva de Venezuela, p. 411, 1942 (Venezuela).

U.S.N.M. No. 123168, 1 specimen, 209 mm. from Jacuque Point U. S. S. *Niagara*, January 26, 1925.

U.S.N.M. No. 123167, 2 specimens, 135 and 194 mm., from Piedras Bay, U. S. S. *Niagara*, March 14, 1925.

U.S.N.M. No. 123166, 1 specimen, 187 mm., from Estanques Bay, U. S. S. *Niagara*, December 7, 1924.

Order CEPHALACANTHOIDEA

Family DACTYLOPTERIDAE: Flying Gurnards

Genus DACTYLOPTERUS Lacepède

Dactylopterus Lacepède, Histoire naturelle des poissons, vol. 3, p. 325, 1802. (Genotype, *Dactylopterus pipapeda* Lacepède=*Trigla volitans* Linnaeus.) (Genus selected by first reviser instead of *Cephalacanthus* Lacepède, *ibid.*, p. 323.)

DACTYLOPTERUS VOLITANS (Linnaeus)

Volador

Trigla volitans Linnaeus, Systema naturae, ed. 10, vol. 1, p. 302, 1758.
Cephalacanthus volitans Röhl, Fauna descriptiva de Venezuela, p. 411, fig. 228, 1942 (Venezuela).

Order PLEURONECTOIDEA

Suborder Psettodoidea

Family BOTHIDAE: Soles

A key to the species of the flatfish family Bothidae is given by J. R. Norman in a systematic work, "Monograph of the Flatfishes (Heterosomata)," vol. 1, pp. 60–61, 1934, published by the British Museum. Not enough species have been recorded from Venezuela to make it worth while to construct a key in this report. Several other species of flatfishes will undoubtedly be taken when adequate collecting is done along the Venezuelan coast.

Genus CITHARICHTHYS Bleeker

Citharichthys Bleeker, Versl. Akad. Amsterdam, vol. 13, p. 423, 1862. (Genotype, *C. cayennensis* Bleeker.)

CITHARICHTHYS SPILOPTERUS Günther

Citharichthys spilopterus Günther (part), Catalogue of the fishes in the British Museum, vol. 4, p. 421, 1862 (New Orleans; Jamaica; San Domingo; Bahia).

U. S. N. M. No. 121812, 1 specimen, 47 mm., Lago de Maracaibo at Maracaibo Yacht Club, May 16, 1942.

U.S.N.M. No. 121813, 6 specimens, 30 to 66 mm., Lago de Maracaibo at Maracaibo Yacht Club, March 5, 1942.

U.S.N.M. No. 121814, 2 specimens, 22 and 40 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 12, 1942.

1 specimen, 84 mm., Laguna del Río Capatárida at mouth, 5 km. north of Capatárida, F. F. Bond, March 21, 1938.

1 specimen, 101 mm., saline lagoon, El Cable at Carúpano, F. F. Bond, March 30, 1939.

3 specimens, 45 to 77 mm., Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

The following counts were made on the above-listed specimens: Dorsal rays, four counts for 78, one for 79, two for 80, one of 83; anal rays, one count each for 56, 58, 59, two counts each for 60 and 61, one for 62.

Genus ETROPUS Jordan and Gilbert

Etropus JORDAN AND GILBERT, Proc. U. S. Nat. Mus., vol. 4, p. 364, 1882. (Genotype, *Etropus crossutus* Jordan and Gilbert.)

ETROPUS LONGIMANUS Norman

Etropus longimanus NORMAN, Ann. Mag. Nat. Hist., ser. 10, vol. 12, p. 202, 1933 (C. Frio, Brazil).

The following small specimen is identified as this species with uncertainty:

U.S.N.M. No. 123142, 1 specimen, 36 mm., south coast of Gulf of Venezuela, U. S. S. *Niagara*, November 15, 1924.

ETROPUS DELSMANI Chabanaud

Etropus delsmani CHABANAUD, Bull. Mus. Nat. Hist. Nat., ser. 2, vol. 12, p. 149, 1940 (Isla de Santa Margarita).

Suborder SOLEIFORMES

Family ACHIRIDAE: Tonguefishes; Soles; Lenguados

KEY TO THE GENERA AND SPECIES REPORTED FROM VENEZUELA

1*a*. Interbranchial septum between the right and left gill chambers perforated by a roundish opening (fenestra) posteriodorsally.

2*a*. Gill membranes fused with the hyoid, internally and above the pelvic arch, anteroventrally to the fenestra; nasal spine not projecting through the skin in front of tubular nostril; posterior dorsal side of gill opening on blind side with a double membranous flap of skin fringed with cirri along both edges; pectoral fin of one to four short rays; a deep pit on blind side above upper jaw a short distance in front of tubular nostril.

Hypoclinemus mentalis (Günther)

2*b*. Gill membranes not fused to the hyoid-pelvic region, entirely free ventrally; nasal spine projecting through the skin, in front of tubular nostril; posterior dorsal edge of gill opening on blind side with a single fringed membranous flap of skin; pectoral fin well developed, of about 5 rays; no deep pit on blind side above maxillaries and a short distance in front of tubular nostril---------- **Achirus achirus maculipinnis** (Agassiz)

1*b*. Interbranchial septum not perforated; gill membranes free from hyoid region; nasal spine not projecting through the skin in front of tubular nostril; posterior dorsal side of gill opening on blind side with a single free fringed dermal membrane; pectoral fin absent or with one short ray; practically no depression or pit above maxillary and in front of tubular nostril on blind side---------- **Trinectes maculatus brownii** (Günther)

Genus HYPOCLINEMUS Chabanaud

Hypoclinemus CHABANAUD, Bull. Inst. Oceanogr., No. 523, p. 32, 1928. (Genotype, *Solea mentalis* Günther, fixed by Myers, Copeia, No. 171, p. 37, 1929.)

HYPOCLINEMUS MENTALIS (Günther)

Solea mentalis Günther, Catalogue of the fishes in the British Museum, vol. 4, p. 475, 1862 (Rio Capim, Pará).

The following collection was made by Dr. F. F. Bond.

Six specimens, 47.5 to 123 mm., from Río Apure at San Fernando de Apure, November 11, 1938.

These specimens have the following number of fin rays: Dorsal, 53 in two and one count each for 56, 57, 58 and 59; anal, one count each for 41, 42, 43, two for 44, and one for 45; pectoral, one count each for 2 and 4 and four for 3; pelvics, two counts for 4 and ten for 5 rays.

Genus ACHIRUS Lacepède

Achirus Lacepède, Histoire naturelle des poissons, vol. 4, p. 658, 1802. (Genotype, *Pleuronectes achirus* Linnaeus.)

ACHIRUS ACHIRUS MACULIPENNIS (Agassiz)

Sole; Carnada de San Pedro; Lenguado o sol

Monochir maculipennis Agassiz, *in* Spix and Agassiz, Selecta genera et species piscium . . . Brasiliam . . ., p. 88, pl. 49, pl. D, 1831 (Atlantic Ocean, Brazil).

? *Achirus lineatus* Röhl, Fauna descriptiva de Venezuela, p. 390, fig. 199, 1942 (coast of Venezuela).

One specimen, 375 mm. in standard length, from Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

U.S.N.M. No. 121815, a specimen, 48 mm. in standard length, from Lago de Maracaibo at Maracaibo Yacht Club, Maracaibo, March 5, 1942.

The above-listed specimens have dorsal rays 54 and 54; anal rays 43 and 41; the pelvics 5–5 and 5–5; median fins with roundish dark brown spots.

Genus TRINECTES Rafinesque

Trinectes Rafinesque, Atlantic journal and friend of knowledge, vol. 1, p. 20, 1832. (Genotype, *Trinectes scabra* Rafinesque=*Achirus fasciatus* Lacepède.) (Ref. copied.)

TRINECTES MACULATUS BROWNII (Günther)

Lenguado

Solea brownii Günther, Catalogue of the fishes in the British Museum, vol. 4, p. 477, 1862 (New Orleans; Texas).

The following collections I am referring to this subspecies mostly on the basis of Chabanaud's work (Bull. Inst. Oceanogr., No. 661, pp. 1–24, figs. 1–11, 1935).

U.S.N.M. No. 121810, 7 specimens, 18 to 94 mm., from Lago de Maracaibo at Maracaibo Yacht Club, May 16, 1942.

U.S.N.M. No. 121811, a specimen, 79 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

2 specimens, 25 and 29 mm., from salt-water lagoon on coast, 5 km. west of Cumaná, F. F. Bond, March 25, 1939.

1 specimen, 26.5 mm., from Laguna del Río Capatárida at mouth, 5 km. north of Capatárida, Estado de Falcón, F. F. Bond, March 21, 1938.

1 specimen, 15 mm., from Río Marguanta, tributary to Río Orinoco, F. F. Bond, March 10, 1939.

7 specimens, 26 to 43 mm., from Laguna de Tacarigua, Estado de Miranda, F. F. Bond, February 3, 1939.

Order DISCOCEPHALIOIDEA

Family ECHENEIDAE: Sharkpilots; Remoras

Genus ECHENEIS Linnaeus

Echeneis Linnaeus, after Artedi, Systema naturae, ed. 10, p. 260, 1758. (Genotype, *Echeneis neucrates* Linneaus.)

ECHENEIS NEUCRATES Linnaeus

Rémora o Pega

Echeneis neucrates Linnaeus, Systema naturae, ed. 10, p. 261, 1758.—Röhl, Fauna descriptiva de Venezuela, p. 410, fig. 227, 1942 (coast of Venezuela).

U.S.N.M. No. 128264, 1 specimen, 159 mm. in standard length, from Piedras Bay, Gulf of Venezuela, March 14, 1925, U. S. S. *Niagara.*

Order PLECTOGNATHOIDEA

Suborder Balistoidea

Family BALISTIDAE: Triggerfishes

Genus BALISTES Linnaeus

Balistes Linnaeus, Systema naturae, ed. 10, vol. 1, p. 327, 1758. (Genotype, *Balistes vetula* Linnaeus.)

BALISTES VETULA Linnaeus

Cachúa o Cochino

Balistes vetula Linnaeus, Systema naturae, ed. 10, vol. 1, p. 329, 1758 (Ascension Island).—Röhl, Fauna descriptiva de Venezuela, p. 409, fig. 226, 1942 (coast of Venezuela).

Suborder Ostracioidea

Family OSTRACIIDAE: Trunkfishes; Cofres

Genus LACTOPHRYS Swainson

Lactophrys Swainson, Natural history and classification of fishes, vol. 2, pp. 194, 324, 1839. (Genotype, *Lactophrys trigonus* (Linnaeus).)

KEY TO THE SPECIES REPORTED FROM VENEZUELA

1*a*. Bony covering or carapace without spines anywhere; body with numerous pale spots dorsally ..... **Lactophrys triqueter** (Linnaeus)

1*b*. Carapace with a spine in front of each eye, another posteriorly on each ventral ridge, and one above and below at front of caudal peduncle; color brownish with blackish spots except on ventral surfaces.

Lactophrys tricornis (Linnaeus)

LACTOPHRYS TRIQUETER (Linnaeus)

CHAPIN O SAPO DE MAR

Ostracion triqueter LINNAEUS, Systema naturae, ed. 10, vol. 1, p. 330, 1758 ("India").

Lactophrys triqueter RÖHL, Fauna descriptiva de Venezuela, p. 385, figs. 192, 193, 1942 (coast of Venezuela).

LACTOPHRYS TRICORNIS (Linnaeus)

TORO O VAQUITO

Ostracion tricornis LINNAEUS, Systema naturae, ed. 10, vol. 1, p. 331, 1758. ("India").

Lactophrys tricornis RÖHL, Fauna descriptiva de Venezuela, p. 386, fig. 194, 1942 (coast of Venezuela).

Suborder TETRAODONTOIDEA

Family TETRAODONTIDAE: Puffers; Tamboriles

KEY TO GENERA OF TETRAODONTIDAE REPORTED FROM VENEZUELA

1*a*. Dorsal rays 8, anal 7, counting rudiments; 2 distinct openings on each more-or-less tubular nostril; inner surface or nasal tube with one or more folds; lower sides of body without a dermal fold along a lateral line tube. **Sphoeroides** Anonymous

1*b*. Dorsal rays 10 to 15; anal 9 to 13.

2*a*. Dorsal rays about 10, anal rays 9 to 10; no dermal fold along lower sides of body; gill opening extends down in front of about 7 pectoral rays; caudal fin truncate or a little concave.

3*a*. Nostrils without a distinct tube or tentacle but with a small porelike opening on each side; back in front of dorsal fin compressed into a low keellike ridge or short prominence; margin of eye without eyelid; snout somewhat pointed---------- **Canthigaster** Swainson

3*b*. Nostrils with 2 distinct openings on each side at tip of a short tube; back without keel, more or less depressed; membrane of eye free ventrally for a short distance, but fused dorsally; snout blunt, rounded. **Colomesus** Gill

2*b*. Dorsal rays about 13 to 15; anal rays 12 or 13; lower sides with a dermal fold along a lateral line tube; tubular nostrils with 2 small openings distally; back without ridge, more or less depressed; membrane of eye free ventrally, fused dorsally; gill opening extending down in front of about 8 to 10 pectoral rays; caudal fin forked **Lagocephalus** Swainson

Genus SPHOEROIDES Anonymous

Sphoeroides (Author anonymous), Allg. Lit.-Zeit., column 676, 1798. (Genotype, *Tetrodon spengleri* Bloch.) (Ref. copied.)

The correct identification of the puffers in the western Atlantic referred to the genus *Sphoeroides* is very difficult if not impossible for certain forms. There appears to be so much variation in size of eye and head and in other morphological characters that most keys lead to doubtful identifications. Since no revision of this genus has been

made and sufficient material of the various forms described are lacking for study, the following tentative key must be used with caution for the area adjacent to the coast of Venezuela and northward. A species difficult to place is *Sphoeroides harperi* Nichols (Bull. Amer. Mus. Nat. Hist., vol. 33, art. 3, p. 81, 1914) from Cape Sable, Fla. This species may be *maculatus*.

Meek and Hildebrand ("The Marine Fishes of Panama", part 3, p. 813, pl. 77, 1928) use the name *Sphoeroides marmoratus* (Ranzani) for a species covered with minute imbricated scales that lacks the line of black spots set off below the dark coloration of upper sides. However, *Tetraodon marmoratus* Ranzani (Dissertationes Quat. Novi Comm. Acad. Sci. Inst. Bonon., vol. 4, p. 73, pl. 10, figs. 1a, 1b, 1840) as represented by the figures is definitely not the same species as the one illustrated on plate 77 of Meek and Hildebrand. I see no reason at present why *T. marmoratus* Ranzani cannot be considered a synonym of *Sphoeroides spengleri* as currently recognized. Specimens of *spengleri* from Brazil appear to be the same as those from Panama and the West Indies.

Sphoeroides marmoratus Meek and Hildebrand (not of Ranzani) I refer to *Sphoeroides eulepidotus* (Metzelaar), basing my opinion on several small series in the national collections.

The color patterns of *maculatus* and *nephelus* and the imbricate scales indicate that *eulepidotus* is very closely related and possibly not distinct from *nephelus*. I do not find any specimens of the typical color pattern of *maculatus* south of the Carolinas in the national collections.

KEY TO CERTAIN SPECIES OF SPHOEROIDES

1*a*. Lower sides with a line of dark bars or roundish spots a little below and well set off from darker ground color of upper sides and back, these bars or spots numbering 5 in front of the pectoral base and 7 or 8 behind it, totaling 12 or 13.

2*a*. Dark spots in a line roundish to oval in shape and black spot at lower rear base of pectoral not quite reaching to middle of pectoral fin base and little or no darker than others in line; a black bar across caudal fin distally and another basally, separated by a pale bar; back variably light spotted and dark spotted; least distance between bases of nasal tubes about 5 to 7 times in the snout; postorbital length of head 1.5 to 2 times in snout; dermal papillae often present on sides; body often with prickles in front of dorsal and anal fins; distal margins of dorsal and anal fins rounded; dermal cirri often occurring on the sides of young specimens ..... **Sphoeroides spengleri** (Bloch)

2*b*. Line of dark bars vertically elongate and extending up into dark ground color of sides; black spot or bar in axil of pectoral much darker than any of others in the line and usually reaching up to or above midpectoral base; no blackish or pale bars across caudal fin; back usually dark spotted; least distance between bases of nasal tubes about 3.5 to 5 times in snout; postorbital length of head 1.25 to 1⅔ in snout; anterior

parts of body in front of dorsal and anal fins profusely prickly, and scales somewhat imbricated occurring all over body in young, but in adults the body smoother, especially caudal region.

Sphoeroides maculatus [27] (Bloch and Schneider)

2*c*. Line of dark bars vertically elongate but hourglass-shaped behind pectoral; black spot in axil of pectoral intensified but not reaching above middle of base of pectoral; upper part of body brownish and overlaid with numerous very small circular-shaped white blotches everywhere; caudal fin plain pale in color; least distance between bases of nasal tubes about 4.5 to 5 times in snout; postorbital length of head 1.5 to 1⅔ in snout; body prickly anteriorly and covered with small imbricated scales; prickles usually with 4-pointed bases; distal margin of dorsal fin truncate, that of anal rounded_____**Sphoeroides nephelus** [28] (Goode and Bean)

1*b*. Line of dark bars or spots absent, or, if present, not separated from dark ground color of sides and back.

3*a*. Back darkish (often greenish when alive) with pale lines forming a coarsely reticulated pattern and the sides have small dark spots, more numerous with age, but fading ventrally so that the belly is white as usual; caudal fin more or less darkish with a pale bar across the fin a little closer to its base than distally; scales not noticeably developed although anteriorly the body is prickly; least distance between nostrils 2.75 to 3 times in snout; postorbital length of head 1.2 in snout; distal margin of dorsal truncate or slightly rounded_____**Sphoeroides testudineus** (Linnaeus)

3*b*. No pale lines forming a reticulated color pattern on back.

4*a*. Color plain brownish above and largely on sides, with a single large blackish spot, somewhat vertically elongate, on middle of sides a little in advance of dorsal origin; sometimes a pair of dermal cirri on middle of back; brownish color of back with small pale specks or spots; body not covered with small imbricated scales although small glandular-like scales occurring irregularly on body; body prickly anteriorly; caudal fin with a dark bar distally and one basally separated by a pale bar; least distance between bases of nasal tubes about 5 to 6.25 times in snout; postorbital length of head about 1.75 to 2 times in snout; distal margin of dorsal fin truncate; that of anal truncate or a trifle rounded; outer rays of caudal fin a little longer than others, so that distal margin of this fin is slightly concave.

Sphoeroides dorsalis [28] (Longley)

4*b*. Body everywhere, except ventrally, with brown spots, these spots not in rows, their number apparently increasing with age; caudal fin usually, except in larger specimens, with a pale bar across middle separating more or less distinct darker bars distally and basally; body everywhere covered with numerous very small imbricated scales; least distance between bases of nasal tubes contained 4.5 to 6 times in snout; postorbital length of head 1.25 to 1⅓ in snout; dorsal slightly rounded to truncate distally, anal fin rounded; dermal cirri usually present on sides_____**Sphoeroides eulepidotus** (Metzelaar)

SPHOEROIDES SPENGLERI (Bloch)

Tetrodon spengleri Bloch, Ichthyologie, ou Histoire naturelle des poissons, vol. 4, p. 134, pl. 144, 1797.

[27] Not reported from Venezuela and probably not occurring south of Florida.

[28] Not reported from Venezuela but occurring off Florida and in West Indies.

This species has a distribution from Florida and Gulf of Mexico through the West Indies to Brazil and most certainly will be taken off Venezuela, although so far I fail to find any record of its capture from that country.

SPHOEROIDES TESTUDINEUS (Linnaeus)

YEQUE O SAPO BRUTO

Tetraodon testudineus LINNAEUS, Systema naturae, ed. 10, p. 332, 1758.
Sphoeroides testudineus RÖHL, Fauna descriptiva de Venezuela, p. 387, fig. 195, 1942 (coast of Venezuela).

U.S.N.M. No. 121700, 36 specimens, 22 to 118 mm. in standard length, Lago de Maracaibo at Yacht Club, Maracaibo, May 16, 1942.

U.S.N.M. No. 121701, 22 specimens, 20 to 61 mm., Lago de Maracaibo opposite Salina Rica, 5 km. north of Maracaibo, February 20, 1942.

U.S.N.M. No. 121699, 94 specimens, 18 to 94 mm., Lago de Maracaibo at Yacht Club, Maracaibo, February 27 and March 5, 1942.

U.S.N.M. No. 121698, 17 specimens, 21 to 101 mm., mouth of Caño de Sagua, 25 km. north of Sinamaica, March 21, 1942.

U.S.N.M. No. 121697, 78 specimens, 17 to 122 mm., Lago de Maracaibo, 7 km. south of Maracaibo, March 6, 1942.

Two specimens, 60 and 93 mm., a baja seca, east side of Puerto Cabello, F. F. Bond, January 26, 1938.

SPHOEROIDES EULEPIDOTUS (Metzelaar)

Tetrodon (Spheroides) eulepidotus METZELAAR, Rapport Onderz. Toest. Viss. Ind. Zeeprod. Kol. Curaçao, vol. 2, p. 170, fig. 54, 1919 (Lesser Antilles).

Specimens before me from the collection in the United States National Museum indicate that this species ranges from Texas, Panama, and West Indies to Rio de Janeiro, Brazil.

U.S.N.M. No. 122001, 4 specimens, 22 to 5 mm., in standard length, Cape San Román, U. S. S. *Niagara*, April 2, 1925.

U.S.N.M. No. 122002, 1 specimen, 13 mm., south coast of Gulf of Venezuela, U. S. S. *Niagara*, November 15, 1925.

U.S.N.M. No. 121702, 1 specimen, 29.5 mm., from a brackish caño at Los Monitos, Río Limón system, Leonard P. Schultz, March 11, 1942.

Genus CANTHIGASTER Swainson

Canthigaster SWAINSON, The natural history and classification of fishes, vol. 2, p. 194, 1839. (Genotype, *Tetrodon rostratus* Bloch.)

CANTHIGASTER ROSTRATUS (Bloch)

Tetrodon rostratus BLOCH, Ichthyologie, ou Histoire naturelle des poissons, vol. 5, p. 4, pl. 146, fig. 2, 1787 ("Indes orientales").
Tetrodon (Canthigaster) rostratus METZELAAR, Rappt. Onderz. Toest. Viss. Ind. Zeeprod. Kol. Curaçao, vol. 2, p. 171, 1919 (Venezuela).

Genus COLOMESUS Gill

Colomesus GILL, Proc. U. S. Nat. Mus., vol. 7, p. 422, 1884. (Genotype, *Tetrodon psittacus* Bloch and Schneider.)

COLOMESUS PSITTACUS (Bloch and Schneider)

Tetrodon psittacus Bloch and Schneider, Systema ichthyologiae, p. 505, 1801 (Malabar).

Colomesus psittacus Fowler, Proc. Acad. Nat. Sci. Philadelphia, 1911, p. 437 (Tucapita on Río Manamo; Pedernales, Venezuela).

Genus LAGOCEPHALUS Swainson

Lagocephalus Swainson, The natural history and classification of fishes, vol. 2, pp. 194, 328, 1839. (Genotype, *Lagocephalus stellatus* Donovan.)

LAGOCEPHALUS LAEVIGATUS (Linnaeus)

Tetraodon lagocephalus Linnaeus, Systema naturae, ed. 10, vol. 1, p. 332, 1758 ("India").

Tetraodon (*Lagocephalus*) *pachycephalus* Metzelaar, Rappt. Onderz. toest. Viss. Ind. Zeeprod. kol. Curaçao, vol. 2, p. 169, 1919 (Cumana, Venezuela).

U.S.N.M. No. 122000, 1 specimen, 230 mm. in standard length, Estanques Bay, U. S. S. *Niagara*, December 9, 1924.

U.S.N.M. No. 122003, 1 specimen, 42 mm., Jacuque Point, U. S. S. *Niagara*, January 26, 1925.

Our series of *Lagocephalus laevigatus* before me indicates that *Tetraodon pachycephalus* Ranzani is a synonym and that the depth and head length vary considerably with increase in size.

Suborder DIODONTOIDEA

Family DIODONTIDAE: Porcupinefishes

Genus DIODON Linnaeus

Diodon Linnaeus, Systema naturae, ed. 10, vol. 1, p. 334, 1758. (Genotype, *Diodon hystrix* Linnaeus.)

Two species of *Diodon*—*hystrix* and *holacanthus*—are currently recognized, but after examining a rather large series of both as indentified by several ichthyologists in the past, I find so much overlapping in the two forms that I must cast serious doubt on their distinctness. I notice that specimens up to 50 to 200 mm. in standard length have relatively longer frontal spines than postpectoral spines, some dermal cirri along lower sides of body and usually a pair under the chin. On all the large specimens of *Diodon*, however, I fail to locate these dermal cirri, and the frontal spines appear to be shorter than the postpectoral ones, but this is caused by more of the base of the frontal spines being embedded in the skin. The genus is in need of revision. Provisionally I am combining *hystrix* and *holacanthus* because I am unable to separate the two species as based on the material before me from the Atlantic and Pacific Oceans.

DIODON HYSTRIX Linnaeus

Erizo o Puerco espín

Diodon hystrix Linnaeus, Systema naturae, ed. 10, vol. 1, p. 335, 1758 (India).—Röhl, Fauna descriptiva de Venezuela, p. 388, fig. 196, 1942 (coast of Venezuela).

U.S.N.M. No. 122004, a specimen 100 mm. in standard length, Gulf of Venezuela, U. S. S. *Niagara*, 1925.

The following counts were made: Dorsal rays 14 in 3 and 15 in 1 specimens; anal 13 rays in 2, and 14 in 3 specimens; pectoral rays 21 in one specimen, 22 in 6 counts, and 23 in 3.

Order GOBIESOCIFORMES

Family GOBIESOCIDAE: Clingfishes; Trepadores

During my attempt to identify the Venezuelan specimens of clingfishes in the national collections, it became clear to me that the American Gobiesocidae were in a state of confusion and were in need of revision. This was necessary before I could determine the genus or species to which the Venezuelan clingfishes belonged. After 3 months of work, a manuscript was prepared and published (Schultz, 1944e). The following key was modified from that publication so as to key out all American genera, and it includes only those species that have been reported from Venezuela:

1*a*. Groove between tip of snout and upper lip of premaxillaries extending around front of snout and not forming a convex curve dorsally over tip of snout; width of middle of upper lip narrow, about the same as laterally, and approximately equal to width of pupil; gill membranes attached opposite third and fifth upper pectoral fin rays; axial flap of skin behind pectoral fin with its upper edge attached at midbase of pectoral fin or below midbase; fleshy pad on outer pectoral base present only ventrally, without a free margin posteriorly and enlarged or swollen at lower posterior corner of pectoral fin base; the lower first to fifth pectoral rays short, about half length of longest pectoral ray, the eighth and ninth much longer than lower pectoral rays; anal rays 6 or 8; dorsal rays 6 or 7 (all rudiments counted as one ray).

2*a*. Incisorlike teeth at front of lower jaw with 4 minute points[29]; those at front of upper jaw mostly conical; each jaw with 1 or 2 inner rows of minute conical teeth; axial flap of skin behind pectoral fin attached at lower part of pectoral fin base; anal origin a little behind a vertical line through dorsal origin; greatest depth of body 5.5 to 6.5, length of head 3 to 3.25, greatest width of head 4.5 to 5, length of disk 5 to 5.5, all in standard length; length of disk about equal to distance from tip of snout to front of disk; pectoral rays about 19 to 21; color when alive green or reddish, with or without light spots (Florida Keys and West Indies).

Acyrtus Schultz[30]

2*b*. Incisorlike teeth at front of lower jaw with smooth tips; middle front teeth of upper jaw conical; teeth in inner rows of both jaws shorter, smaller, and conical; axial flap of skin behind pectoral fin attached opposite middle of pectoral base; greatest depth of body 8 or 9, length of head 3.5 to 3.8, greatest width of head 5, length of disk 5.5, all in standard length; anal origin a little in advance of dorsal origin; interorbital space 3.5 in head, eye 1.5 in interorbital space; length of disk about equal to

[29] Sometimes the middle two teeth are worn down nearly smooth, as in the type of *G. beryllinus* Hildebrand and Ginsburg.

[30] Not yet reported from Venezuela.

caudal peduncle; lower pectoral rays shorter, second and third from bottom about half length of longest pectoral fin rays; pectoral fin rays about 16 or 17 (Todos Santos Bay, Baja California, to Monterey, Bay and west coast of Vancouver Island, British Columbia).

Rimicola Jordan and Evermann

1*b*. Tip of snout formed by premaxillaries, which are much wider at middle of snout than laterally, groove arched dorsally over tip of snout; axial flap of skin behind pectoral fin with its upper edge attached much above the midbase of this fin; lower first to seventh pectoral fin rays not shortened, about as long as eighth or ninth from bottom.

3*a*. Anterior teeth of lower jaw trifid incisors, trifid tips usually evident, except the middle 2 or 3 may be worn off smooth although 1 or 2 of more laterally placed incisors at front of lower jaw are always trifid.

4*a*. Gill membrane attached opposite third to fifth pectoral fin rays; front teeth of upper jaw smooth-tipped incisors (sometimes flattened-coniform); front of both jaws with 1 or 2 inner rows of small conical teeth behind outer row of enlarged incisorlike teeth, sometimes these inner rows apparently represented by only 2 or 3 teeth; fleshy pad on outer base of pectoral fin with free posterior margin ending a little below attachment of gill membranes; greatest width of head 3, length of head 2.75 to 2.8, greatest depth of body 5 to 6, length of disk 3.5, all in standard length; length of disk much greater than distance from tip of snout to front of disk; distance from dorsal origin to midbase of caudal fin contained 1.75 to 1.8 times in snout tip to dorsal origin; anal origin under base of the third or fourth dorsal fin ray; caudal peduncle short, its depth about equal to its length and about 3 times in base of dorsal fin; dorsal fin rays 11 to 13, anal 10 or 11, pectoral 18 or 21 (usually 19 or 20) (Gulf of California; southern California).

Infratridens Schultz

4*b*. Gill membranes joined opposite upper edge of pectoral fin base; incisor-like teeth of both jaws with trifid tips except middle pair or two sometimes smooth tipped; teeth in both jaws in a single row, lateral 2 to 4 conical and last 1 or 2 sometimes strong canines; outer lower base of pectoral fin with fleshy pad poorly developed and without any trace of free margin; pelvic fins joined about halfway out fourth to sixth pectoral fin rays and not near base; dermal flap in axil of pectoral fin joins opposite the fourth to tenth pectoral fin ray; width of head 3.5 to 6, length of head 2⅔ to 5, greatest depth of body usually 6 to 10, length of disk usually 4 to 6, all in standard length; opercular spine not strongly developed and not reaching to rear of head.

Arbaciosa Jordan and Evermann

5*a*. A pair of black spots (more or less ocellate) on back behind head over pectorals usually distinct, each spot well separated; dorsal surface of back in front of dorsal origin variously barred or mottled or dark spotted but without 3 hourglass-shaped large dark blotches. (Species inhabiting waters of Pacific coast and offshore islands.)

5*b*. Three or four large hourglass-shaped dark brown or blackish blotches from in front of dorsal fin to rear of head; a fainter one sometimes on top of head; side of head with 4 oblique bars and sides of body with dark bars; incisors with trifid tips; dorsal rays 7 to 9; and 6 to 9 (rarely 6 or 9); pectorals 18 to 23 (West Indies; Guatemala to Brazil).

Arbaciosa fasciata (Peters)

3*b*. None of teeth with trifid tips.

6*a*. Middle pair of incisors on both jaws much broader and longer than adjoining pairs; posterolateral teeth small and conical; rims of orbits bony, elevated; opercular spine strongly developed and forming posteriormost tip of head; valvular flap and margin of anterior nostril with its margin finely fringed with short cirri; gill membrane attached at upper anterior edge of pectoral fin base; fleshy pad well developed on outer lower surface of pectoral base, with a free membranous edge posteriorly ending at base of tenth to twelfth pectoral ray; shoulder girdle with a free dermal flap extending dorsally nearly to attachment of gill membrane; anal origin under base of second or third from last dorsal fin ray; disk large, its length about equal to head and contained about 2.4 to 2.8 in standard length; anus just behind rear margin of disk; origin of dorsal fin a trifle closer to tip of opercular spine than midcaudal fin base; dorsal rays 10 or 11 (usually 11); anal 8 or 9; pectoral 24 or 25 (Chile and Peru; Juan Fernández Islands).

Sicyases (Müller and Troschel)

6*b*. Middle pair of incisors not enlarged, all incisorlike or conical teeth at front of both jaws of nearly same size and length; front of lower jaw with small incisors in 2 or 3 pairs, with smooth tips; posterolateral teeth smaller, conical, sometimes one or two a little enlarged and almost caninelike; usually a small patch of very short conical teeth behind outer row of larger teeth at front of jaws but sometimes lacking or reduced to 1 or 2 teeth; rims of orbits not elevated or bony; anterior nostril with a dermal flap, sometimes with bifid or even multifid tips arising on posterior rim, but nostrils not fringed with short cirri.

7*a*. Short blunt papillae on lips and around mouth generally, these in form of short barblets, arrangement as follows: Median part of chin and lower jaw with 2 or 3 rows of papillae, or chin anteriorly with a pair of low lobes in form of reversed parentheses [) (] and sometimes at their inner tips a pair of papillae (more or less fused with the anterior lobes in *nigripinnis* and in *pinniger*); an inner row of barblets lateral to median lobes, one pair on each side; lower lip at each side of median part of chin lobelike, sometimes bearing 2 small papillae; 2 or 3 large papillae or knobs on each side along inner edge of groove of lower jaw; upper lip with a median papilla or knob and 5 more on each side; front edge of snout above groove without papillae but laterally 3 to 5 knobs or papillae present or absent; sometimes another papilla occurring behind rictus and still another below rictus; gill membranes joined opposite fifth to seventh upper rays of pectoral fin; fleshy pad on outer base of pectoral fin with a free posterior membranous margin extending dorsally to opposite attachment of gill membranes; dorsal rays 10 to 19; pectoral fin rays 21 to 27; anus closer to anal origin than to rear margin of disk. (Maryland to West Indies to Brazil in Atlantic; Gulf of California to Peru and Cocos Island, in Pacific, *Cotylis* Müller and Troschel.) Depth 4.5 to 6.5, eye 3.1 to 3.6 in length of base of dorsal fin; dorsal rays usually 11, anal usually 9, pectoral rays 22 to 26 (Maryland to West Indies to Brazil).

Cotylis nigripinnis nigripinnis (Peters)

7*b*. No papilla on upper lip, lobelike structures occurring around lips of the lower jaw when best developed being low knobs or ridges, chin lacking inner series of papillae as described for *Cotylis*.

8*a*. Gill membranes joined at upper edge of pectoral fin base, sometimes a little anteriorly, giving appearance of being opposite bases of upper first to third pectoral fin rays or the orbits larger than inter-

orbital space; incisorlike teeth at front of lower jaw projecting forward in a nearly horizontal or oblique direction, usually middle pair a little larger than those laterally.

9*a*. Anal rays 10 to 14; dorsal rays 12 to 16, pectoral rays 19 to 23 (counting all rudiments); fleshy pad on outer margin of pectoral fin base very well developed and free membranous border along its posterior edge extending up to or beyond twelfth pectoral ray from the dorsal edge; interorbital space equal to or wider than eye; least depth of caudal peduncle 4.5 to 5.25 times in dorsal origin to midcaudal fin base; anal origin under anterior third of dorsal fin base (Peru and Chile; San Diego to Queen Charlotte Island, Puget Sound)____**Sicyogaster** Brisout de Barneville

9*b*. Anal rays 7 or 8; dorsal 7 to 9; pectorals 22 to 25; diameter of eyes greater than interorbital space except in large adults equal; interorbital space about three-fifths to three-fourths in eye, color usually reddish when alive (Galápagos Islands: Panama Bay; Mazatlán, Gulf of California; Bahama Islands; West Indies)_____**Arcos**[31] Schultz

8*b*. Gill membranes joined opposite third to seventh upper pectoral fin rays somewhat more anteriorly than in *Cotylis;* incisorlike teeth at front of lower jaw not projecting horizontally forward but curved obliquely upward so as to be nearly opposite those in upper jaw, the pair of incisors at middle of lower jaw nearly same size as adjoining ones; outer surface of pectoral fin base with a distinctly fleshy pad, posterior margin free and joined opposite attachment of gill membranes (Bahamas and West Indies; Texas, Central America to Brazil in Atlantic; Gulf of California to Colombia and Cocos Island in Pacific, *Gobiesox* Lacepède). Disk much greater than distance from tip of chin to front of disk; origin of dorsal fin equidistant between midcaudal fin base and rear one-third of pectoral fin rays or a little behind them; anal origin under fifth dorsal fin ray, behind middle of base of rays of that fin; teeth of lower jaw not projecting forward in a nearly horizontal position but directed nearly straight upward in adults, a little more oblique in young specimens; head 2.2 to 2.7, disk 2.6 to 3.3 and depth 4 to 5.5, all in standard length; dorsal rays 8 or 9, anal 5 to 7, pectoral 18 to 21; anus equidistant between anal origin and rear margin of disk or a little nearer to anal origin; eye 1⅓ (young) to 5 (adults) times in interorbital space; length of disk when measured from its rear margin reaching nearly to end of anal fin usually from midbase to base of last anal ray; small dark spot often present near front of base of dorsal fin (Costa Rica, West Indies, to Brazil).

Gobiesox cephalus Lacepède

Genus ARBACIOSA Jordan and Evermann

Arbaciosa Jordan and Evermann, *in* Jordan, Proc. California Acad. Sci., ser. 2, vol. 6, p. 230, 1896. (Genotype, *Gobiesox humeralis* Gilbert.)

ARBACIOSA FASCIATA (Peters)

Sicyases fasciatus Peters, Monatsb. Akad. Wiss. Berlin, 1859, p. 412, 1860 (Puerto Cabello).—Günther, Catalogue of the fishes in the British Museum, vol. 3, p. 497, 1861 (Puerto Cabello); Trans. Zool. Soc. London, vol. 6, p. 390.

[31] Not yet reported from Venezuela.

1868 (Puerto Cabello).—Jordan, Evermann, and Clark, Rep. U. S. Comm. Fish. for 1928, pt. 2, p. 490, 1930 (Puerto Cabello).

Gobiesox fasciatus Jordan and Evermann, Rep. U. S. Comm. Fish and Fish. for 1895, App., p. 492, 1896 (Puerto Cabello); U. S. Nat. Mus. Bull. 47, pt. 3, p. 2338, 1898 (Puerto Cabello).

Genus COTYLIS Müller and Troschel

Cotylis Müller and Troschel, *in* Müller, Arch. für Naturg. (Wiegmann), Jahrg. 9, vol. 1, p. 297, 1843. (Genotype, *Cotylis nuda* Müller and Troschel=*Lepadogaster nudus* Bloch and Schneider=*Gobiesox gyrinus* Jordan and Evermann=*Gobiesox nigripinnis* Peters.)

COTYLIS NIGRIPINNIS NIGRIPINNIS Peters

Cotylis nigripinnis Peters, Monatsb. Akad. Wiss. Berlin, 1859, p. 412, 1860 (Puerto Cabello).

Gobiesox nigripinnis Günther, Catalogue of the fishes in the British Museum, vol. 3, p. 502, 1861 (Puerto Cabello); Trans. Zool. Soc. London, vol. 6, p. 390, 1868 (Puerto Cabello).—Jordan and Evermann, Rep. U. S. Comm. Fish and Fish. for 1895, App., p. 491, 1896 (Puerto Cabello); U. S. Nat. Mus. Bull. 47, pt. 3, p. 2331, 1898 (Puerto Cabello).—Jordan, Evermann, and Clark, Rep. U. S. Comm. Fish. for 1928, pt. 2, p. 488, 1930 (Puerto Cabello).

Genus GOBIESOX Lacepède

Gobiesox Lacepède, Histoire naturelle des poissons, vol. 2, p. 595, fig., 1800. (Genotype, *Gobiesox cephalus* Lacepède.)

GOBIESOX CEPHALUS Lacepède

Gobiesox cephalus Lacepède, Histoire naturelle des poissons, vol. 2, pp. 595, 596, fig., 1800 (fresh-water rivers of South America).

The following specimens in the collections of the U. S. National Museum were collected by Lyon and Robinson on August 1 and 2, 1900, at Macuto, near La Guaira, in a fresh-water stream.

U.S.N.M. No. 93815 to 93817, 8 specimens, 115 to 145 mm. in standard length.
U.S.N.M. No. 93820 to 93822, 5 specimens, 73 to 100 mm.
U.S.N.M. No. 93827, 3 specimens, 124 to 132 mm. in standard length.

Order BATRACHOIDEA

Family BATRACHOIDIDAE: Toadfishes

Genus BATRACHOIDES Lacepède

Batrachoides Lacepède, Histoire naturelle des poissons, vol. 2, p. 451, 1800. (Genotype, *Batrachoides tau* Lacepède.)

BATRACHOIDES SURINAMENSIS (Bloch and Schneider)

Sapo de mar

Batrachus surinamensis Bloch and Schneider, Systema ichthyologiae, p. 43, 1801 (Surinam).

Batrachoides surinamensis Fowler, Proc. Acad. Nat. Sci. Philadelphia, vol. 63, p. 437, 1911 (Pedernales, Venezuela).—Röhl, Fauna descriptiva de Venezuela, p. 412, 1942 (coast of Venezuela).

Order PEDICULATIFORMES

Suborder ANTENNARIOIDEA

Family OGCOCEPHALIDAE: Batfishes

Genus OGCOCEPHALUS Fischer

Ogcocephalus FISCHER, Zoögnosia, Tabl. Syn., ed. 3, vol. 1, pp. 70, 78, 1813. (Genotype, *Lophius vespertilio* Linnaeus.) (Ref. copied.)

OGCOCEPHALUS VESPERTILIO (Linnaeus)

MURCIÉLAGO DE MAR

Lophius vespertilio LINNAEUS, Systema naturae, ed. 10, vol. 1, p. 236, 1758 (Oceano Americano).—RÖHL, Fauna descriptiva de Venezuela, p. 413, figs. 229, 230, 1942 (coast of Venezuela).

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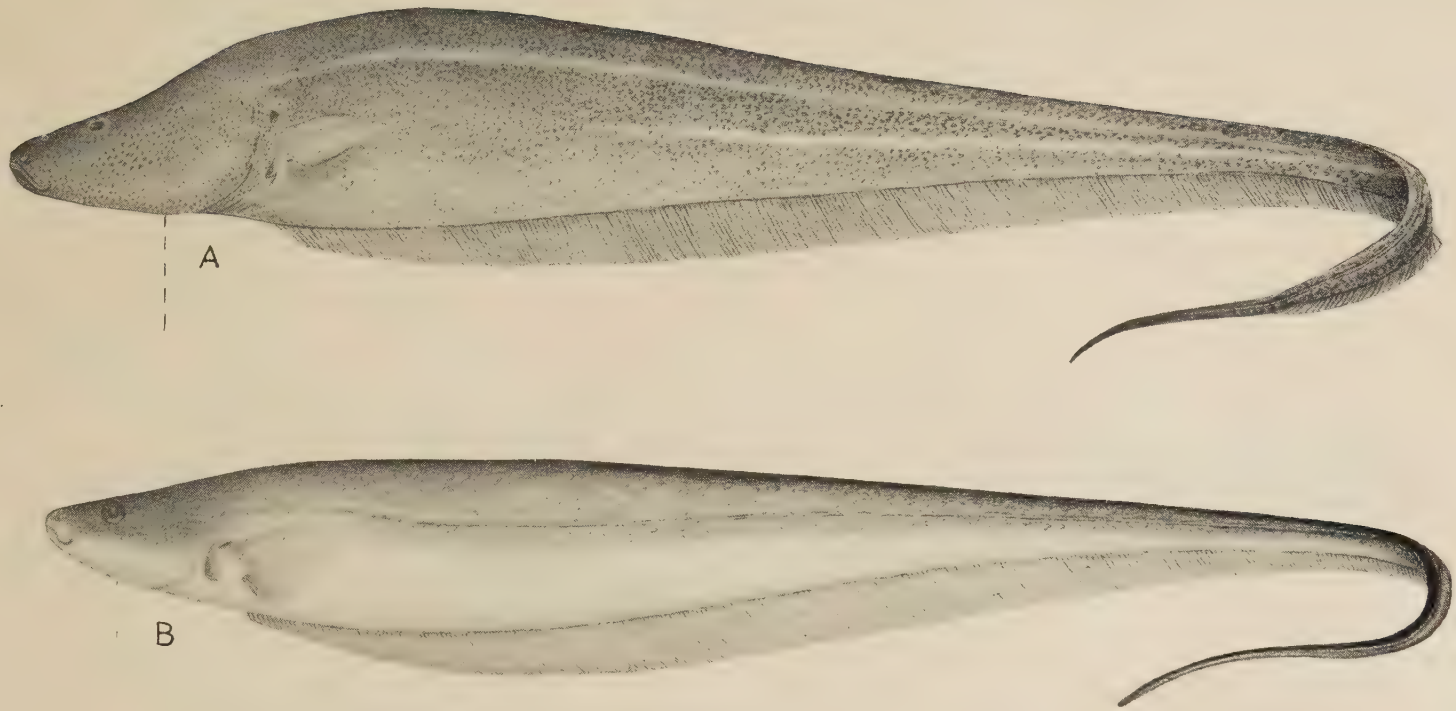
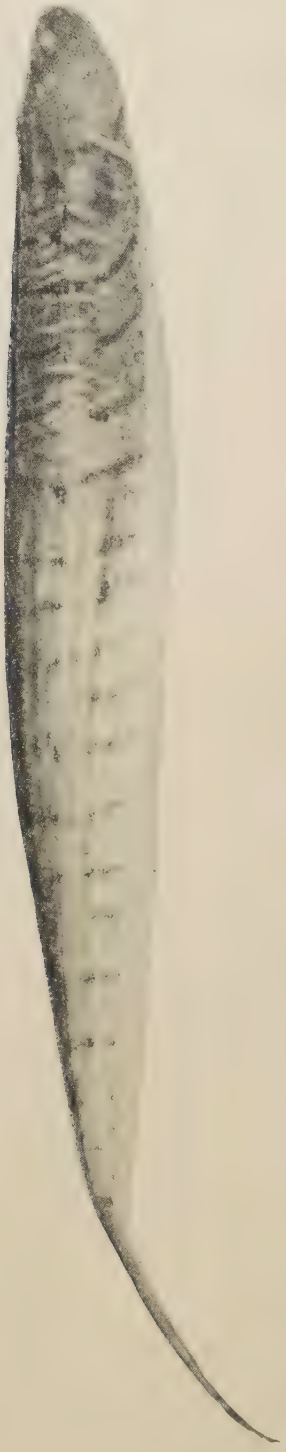
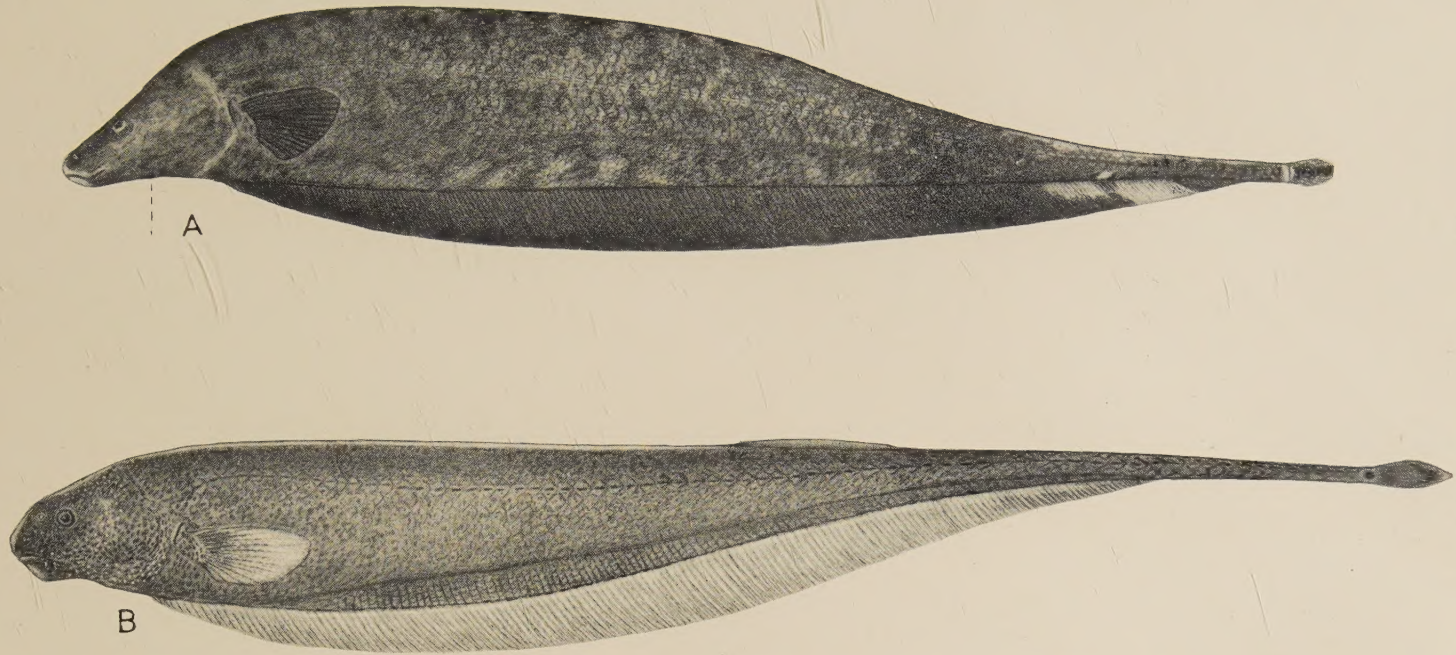


A, *Sternopygus pejeraton*, new species: Holotype (U.S.N.M. No. 121572), 505 mm. in total length; B, *Eigenmannia goajira*, new species: Holotype (U.S.N.M. No. 121596), 500 mm. in total length. Drawings by Mrs. Aime M. Awl.



Hypopmus beebei Schultz: Holotype (U.S.N.M. No. 120753), 136 mm. in tota length. Photograph.



A, *Apteronotus cuchillo*, new species: Holotype (U.S.N.M. No. 121591), 363 mm. in total length; B, *Sternarchogiton cuchillejo*, new species: Holotype (U.S.N.M. No. 121600), 168 mm. in total length. Drawings by Mrs. Aime M. Awl.